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In the Gilding of All Articles from Statuary to the Edges and Lettering of Books Gas May Well Have a Considerable Part

Numerous Industries, Some Closely Allied, Others Only Remotely Connected, Engaged in the Work—Purposes for Which Gas May Be an Efficient Aid

By GILBERT C. SHADWELL

The subject of gilding is embraced by numerous industries, some of which are closely allied to one another, others being only remotely connected. The operations, however, employ heat in so many cases, and the logical fuel is gas in practically every instance, that it seems of value to record something of the process involved.

Some of these processes involve immersion in hot solutions, resulting either in a chemical or physical deposition or a combination of the two; others are merely mechanical operations. For example, gilding may be carried out by immersion in a solution of chloride of gold; that is to say, articles of steel, copper, silver and some others of the brass metals may be gilded by simply immersing them in a weak solution of chloride of gold. This is, however, more interesting as a fact than of any practical value except when appreciably modified.

The gilding of brass and copper is a process often carried out in the case of certain cheap jewelry and, as it will possibly be met with by gas men, a few words may be said on the subject. The following formula has thus been adopted for water gilding, as it is termed: Fine gold, 6¼ dwt. Convert the gold into chloride by means of aqua-regia and dissolve it in 1 qt. of distilled water; then add 1 lb. of bicarbonate of potassium. The mixture is then put into a suitable gas-fired cauldron and boiled for two hours.

The articles to be gilded are then immersed in the warm solution for a few second; up to one minute, according to the activity of the bath.

Cleanliness of Prime Importance—How Secured

Another method of gilding brass and copper articles by simple immersion is to first dip them in a solution of protonitrate of mercury (made by dissolving quicksilver or mercury in nitric acid and diluting with water), and then dipping them into the gilding liquid. It is said that copper may be gilded so perfectly by this method as to resist for some time the corrosive action of strong acids. During the action which takes place the film of mercury solution is electropositive to the gold, dissolves in the auriferous solution, and a film of gold is deposited in its place.

The matter of cleanliness in such operations is of prime importance, because any grease or dirt will cause a film to form, resulting in unevenness of deposition. A gas-fired or steam-heated potash or soda tank or kettle with a corresponding equipment for hot water is ideal for cleansing the articles and rinsing them preparatory to carrying out the operations outlined. A process of gilding which was common with concerns making small picture frames and similar articles was as follows: A little honey is heated up and allowed to cool until lukewarm. This is placed in a shallow dish with some leaf gold. The two substances are then stirred together with a glass rod, the lower end of which is flat. The resulting paste is then thrown into a glass vessel containing water mixed with a little alcohol. It is then washed and allowed to settle. The liquid is then decanted and the deposit washed again. This operation is repeated several times, until the result is a fine pure brilliant powder of gold. This powder mixed with common salt and powdered cream of tartar, and stirred up in water, is then used for the gilding work.

Another method of gilding is the following: Dissolve in aqua-regia (a mixture of nitric and hydrochloric acids) 1 grain of fine gold, rolled out very thin, in a porcelain capsule heated on a sand bath over a bunsen burner and concentrated till it is the color of ox blood. Add 1 pint of distilled water, hot, in which have been dissolved 4 grains of white cyanide of potassium, stir with a glass rod and filter the liquid through unsized paper. To gild with this liquid it is heated a little above lukewarmness and the articles to be gilded are immersed in it and supported upon a piece of very clean zinc.

Bacquerel's gilding solution consists of gold; percyanide of potassium, 10 parts, and water,

100 parts. Dissolve the salts in the water by heating it slightly (not over 100 deg. Fahr.), then filter it. Add 100 parts of a saturated solution of percyanide of potassium and dilute the mixture with once or twice its volume of water. In general the tone of the gilding varies according as the solution is more or less diluted; the color is most beautiful when the liquid is most diluted and most free from iron. To make the surface appear bright, it is sufficient to wash the article in water acidulated with sulphuric acid, rubbing gently with a piece of cloth.

This class of work is carried out to a considerable extent in gilding the higher class of ornamental clocks, etc., and the gas man will find it will pay him to visit a factory where such work is carried out.

A solution frequently used for gilding bronze, etc., is as follows: Small articles may be gilded by immersing them in a solution which has to be used at nearly boiling point. A temperature of about 200 to 210 deg. Fahr. is considered best, and a tank furnace specially made with an enameled boiling chamber is as good an appliance as anything. This equipment is practically a standard article, and those manufacturers making tank furnaces with welded steel tanks (or boiling chambers) will be able to supply the latter enameled at reasonable notice. The solution is made up of caustic potash, 180 parts; carbonate of potash, 20 parts; cyanide of potassium, 9 parts; water, 1,000 parts. Rather more than one-half part of chloride of gold is to be dissolved in the water, when the other substances are to be added and the whole boiled together. The solution must be strengthened from time to time by the adding of chloride of gold; and also, after being worked four or five times, by the addition of the other salts in the proportions named. This bath is recommended chiefly for gilding economically small articles of cheap jewelry, such as emblems, fraternal pins, and so on, and also for giving a preliminary coating of gold to larger articles which are to receive a stronger coating. Here again the matter of cleaning is important, and must be borne in mind all through. The gas man will therefore bear in mind that he can almost always sell a tank furnace, cauldron furnace or soda kettle or tank in duplicate (one being for the soda or potash "lye" and the other for hot water) for the purpose of cleansing and then washing the parts before they are gilded. A sawdust dryer and an oven can also very often form a part of the equipment for manufacturers of such articles as have first been referred to. The sawdust dryer takes up the moisture from the articles via the sawdust (it being usually similar to a jacketed tank furnace but having sawdust in the inner tank into which the articles are also placed; but sometimes they are direct-heated, although not so safe). The use of an oven is for lacquering such articles as convention badges and the like. Gas, in short, has a varied field in the gilding end of many brimiscoes employing one or another of the gilding processes.

When gilding is of an inferior color it is sometimes necessary to use some process to improve the color. There must always be a sufficient coating of gold upon the article to withstand the action of the materials employed. This condition being fulfilled, the artificial coloring process may be applied with advantage and gold surfaces of great beauty obtained—sulphate of copper, 2 dwt.; French verdigris, 4 dwt. 129 R. U. S.; sal ammoniac, 4 dwt.; niter, 4 dwt.; acetic acid, almost 1 oz.

The sulphate of copper, sal ammoniac and niter are first pulverized in a mortar, then the verdigris is added and well mixed with the other ingredients. The acetic acid is then poured in, a little at a time, and the whole worked up together, when a thin mars bluish green color will result.

The article to be colored is to be dipped in the mixture, and then placed on a clean piece of sheet copper, which is next to be heated over a burner or industrial stove of suitable style so as to give an even heat. A low-power concentric atmospheric burner is probably best, especially the improved style with raised parts, or a series of them in an industrial stove can be used.

The heat is applied until the compound assumes a dull black color. It is now allowed to cool, and is then dumped into a tolerably strong sulphuric acid pickle, which soon dissolves the coloring salts, leaving the article a fine gold color. After this the small cauldron furnace spoken of above comes into use and the material is rinsed well in hot water to which a small quantity of carbonate of potash should be added. After, this is brushed (revolving) with warm soap and water, and then rinsed in hot water.

Melting the Salts

In working gold solutions employed in the dipping processes it is often liable to happen that they are patchy instead of being of the desired rich gold color. To overcome this, certain coloring salts are employed, obtaining results somewhat similar to that already mentioned above. The composition in this case, however, is as follows: Nitrate of potash, sulphate of zinc, sulphate of iron and alum—each of equal parts. These substances are placed in a water-jacketed enameled cauldron furnace, or else in an earthenware vessel set in a direct-heated cauldron furnace containing water. The salts are then melted, the temperature in the inner pot being about 210 deg. Fahr., when the mixture is ready for use. The articles are to be brushed over with the composition and then placed in an oven until by applying the moistened tip of the finger to one of the pieces a slight hissing sound is heard. This indicates that the heat has been sufficient. Then the articles should be at once removed and thrown quickly into a very weak sulphuric acid pickle, which dissolves the salts and leaves the work clean and bright. This coloring process has a rather severe action upon gilt work and should not be used when the gilding is but a mere film.

Gilding the Edges of Books

To gild the edges the book is put into the press straight and on a level with the cheeks of the press between cutting boards, the boards of the book being thrown back. The press should be screwed up very tightly and any projection of the cutting boards should be taken away with a chisel. If the paper is unsized or at all spongy the edge should be sized and left to dry. This may be ascertained by the expert by the slightest inspection, but the novice will find

it sometimes necessary to wet a leaf with the tongue. If spongy, the moisture will sink through as with blotting paper. The edge has to be scraped quite flat and perfectly even, care being taken to scrape every part equally, or one part of the edge will be hollow or perhaps one side scraped down, and this will make one seam larger than the other. A mixture of blacklead and thin glair water is then painted over the edge, and with a hard brush it is well brushed until dry.

Parenthetically it may be observed that the sized edge must be positively dry before this is done; moreover, it is hardly necessary to add that the melting of the edge will be carried out in a gas-fired glue heater.

The gold leaf is now cut on the gold cushion. Then tip a leaf out of the book with the gold-knife; lay it on the cushion bratte gently. It can then be cut with ease to any required size or shape. The edge is now glaired evenly and the gold is taken up with a piece of paper previously prepared by draining it over a little oil. The gold is then gently laid on the edge which has been glaired. The whole edge or end having been done, it is allowed to get dry, which will take about two hours in average weather or about five minutes with an air heater of small size.

Before using the burnisher on the gold itself some gilders lay a piece of fine paper on the gold and gently flatten it with the burnisher. Books are often treated in this manner; they then become dull gilt. When intended to be bright a waxed cloth should be gently rubbed over the surface two or three times before using the burnisher

The beauty of burnishing depends upon the edge presenting a solid and uniform metallic surface without any marks of the burnisher.

In the foregoing we have touched on gilding the edges of books only. We will now consider the gilding of the books proper.

Albumin is the ordinary sticking material used by binders to put the gold leaf on, although recently many other materials have been introduced; but white of egg well beaten up is a form of albumin which seems to give very good results. The leather back of the book is varnished with it, and when dry a strip of gold leaf is put in the place where the letters or ornaments are to be printed. The letters used are common printing types, but they must be new, however, and not have been used with printing ink. They are heated to about 240 deg. Fahr., and then they are pressed on the gold leaf for a few seconds only, when the albumin, or white of egg, under it fixes it to the leather of the book. The ornamental types used are commonly made of brass and manufactured for the use of bookbinders, while the type is screwed in an appropriate brass or iron holder fitted with a wooden handle.

The back of a well-bound book being round as a rule, the proper way of putting on the gilded letters and ornaments requires a certain way of manipulation, which can only be acquired by practice. The sides of books being flat, it is best to put the letters and ornaments under a press.

The type is put up in a proper form; it is heated, put under the press with the varnished side of the book, covered with gold leaf on the right place, and the press screwed down. Sometimes the binder puts the sheet of gold leaf on the face of the type in place of on the book. This is equally good, and under certain circumstances possibly better.

Gilding Watch Plates

To gild watch plates after plating with gold, using the regular solution (cyanide) already spoken of, an immersion is carried out in copper sulphate, 3 parts by weight; verdigris, 7 parts by weight; rumonin chloride, 6 parts by weight; potash nitrate, 6 parts by weight, and acetic acid, 31 parts by weight. They use solid or powder form. After dipping, the articles are heated on a plate of copper until they turn dark or black. They are then treated with concentrated sulphate acid.

Instead of the above mixture the following is also used: Alum, 3 parts by weight; potash nitrate, 6 parts by weight; zinc sulphate, 3 parts by weight, and sodium chloride, 3 parts by weight. This is used as a paste. Articles are coated with it and heated on an iron plate until they turn black. They are then washed with cold water.

Gilding on calf and sheep skin, this class of gilding work is done as follows: They wet the leather with albumin in the same way as in the case of work described above. When dry they rub with a little olive oil by hand. The gold leaf is then put on and a gas iron applied. Whatever the hot iron shall not have touched will go off by brushing.

Gilding the edges of cards is carried out in a manner somewhat similar to the gilding of the edges of books. The method adopted is roughly as follows: They obtain an extremely thin leaf of gold and put the cards together so that the edges are perfectly even. Then they are placed in a press, with the exposed edge uppermost. The edge is then coated with a mixture of red chalk and water. The gold is blown out from small books and spread on a leather cushion, where it is cut to the proper size by means of a smooth-edged knife. A camelhair pencil is dipped into whites of eggs mixed with water, and with this the partially dry edge is moistened; the gold is then taken up on a tip brush and applied to the moistened edge, to which it instantly adheres. When all the edges have been gilded in this way and allowed to remain a very few minutes, a burnisher is taken, consisting of a very smooth piece of hard stone (usually "bloodstone"), and the gold is rubbed very forcibly. This is also done by machinery. It has the effect of giving the gold a very high degree of polish.

To silver edges they take a brush, dip it in a saturated solution of gallic acid, and wash the edges; then they dip the brush into a solution composed of 20 parts of nitrate of silver to 1,000 parts of distilled water. They then keep on alternating these solutions until the edges assume a brilliant tint. After this they wash with distilled water and sometimes apply a drying oil or varnish. If much of this work is done, an air heater operated by gas is a valuable adjunct to be used with the dry room.

An alternative method consists in making a composition consisting of 4 parts of Armenian Bole and 1 of candied sugar ground together with water to

(*Continued on page* 407.)

Troubles of European Gas Companies Very Similar to Those in This Country

The Radical Curtailment in Hours of Service and Complete Shutting Down of Plants a By No Means Infrequent Occurrence

By L. W. ALWYN-SCHMIDT

One cannot say that the European gas industry has completely recovered from the war. In fact, disorganization is still prevalent in many directions and will continue to exist until a solution has been found for the multitude of problems that confront European gas men. Of course, the grade of disorganization differs according to country and even locality. Some gas managers have been successful in keeping their organizations going, even in the face of great difficulties; others have been less lucky, because it is luck that has favored one or the other man, especially against his competitor. So it must be called a case of luck if it happened to the gas works of a city in Germany that a train with coal broke down just outside the city and had to be left where it was, practically a present to the local gas works. But the European gas men realize that chance must be eliminated again as much as can be from the household of the gas works, and that successful operation can be carried on only with a certain amount of security for prompt delivery of coal.

Generally speaking, the problems of the gas industry in Europe seem to divide up at present under the following headings:

Labor and wages.
Coal supply.
Equipment maintenance and replacement.
Conservation of gas.
Price of gas.
Utilization of by-products.

In England the labor question seems to be of least importance. England, of course, has lost a great percentage of its gas workers by the war, but the gas works somehow seem to have been able to train new men. Women have taken the place of men in many departments, as for instance as cashiers and inspectors, and have done good service during the war. They will now be replaced again by men. This apparently is not done, because the men are doing better service, but because the women themselves feel that they want to retire again to more congenial occupations. With the return of the men from the army more women have regained their economic support, and the men earning good wages there is no absolute need for the women to go out working. This is an experience that is generally made in the English industry. Naturally, there is a shortage of highly skilled men in the equipment shops that cannot be overcome so easily. Little is said about this phase of the labor situation in the British gas works in the English press, but the English, as a rule, are not given to complaining and rather solve their own problems themselves. In France, unfortunately, matters are not quite as satisfactory. The French army is still not completely dissolved and, while part of it is kept under arms, there remains the necessity of keeping the war organization going. This retains a great many men in supplementary services that could otherwise be usefully employed in the national industries. The gas industry feels the effect of this rather severely, as it has given to the army many skilled engineers. Also there is the necessity of reconstructing the destroyed regions of France, where a number of new gas works have to be erected, and where in consequence many men are needed. Wages in the French industry have been raised considerably, and so have those in England. Unfortunately, the benefit of wage increases has been confined practically entirely to the laboring staff, while the engineers and office workers have been left in the cold. Many of these latter have been severely hurt by the disinclination of their companies to raise their salaries, and there is evidence that some of the best engineers have preferred rather to seek employment in other industries than to return to their former occupations. This development has been supported by the difficult position shared by many educated men when returning to civil life. The gas industry has given a great number of high officers in the engineering and chemical services of the armies, and the better trained of those have risen quickly to rather important positions, being majors and even colonels. They have, during the time of their service, earned good pay and have kept their families in comparative luxury. They are now asked to return again to positions carrying less remuneration than that enjoyed during the war, and naturally do not relish this idea very much.

It is expected that the gas companies will take some steps to regain the assistance of these highly trained officials.

Germany Contemplates Labor Conscription

In Germany the labor problem has taken a new turn after the recent revolution. Where this will finally lead to cannot be said at present, but the situation is certainly charged with all kinds of possibilities. There is just now under consideration a plan that would certainly change the whole situation of the German public utilities. German physicians seem to have come to the conclusion that the loss of military training will be a disadvantage to the health of the German nation, and an attempt, therefore, is made to reintroduce the health-building features of military training, now prohibited by the Peace Treaty, in another manner. A proposition has been made in the Reichstag that provides for the formation of an industrial army of conscripted labor that will serve under the same conditions as the army did before the war. A million men could possibly

be placed in the service of the public utilities, and the same system of employment used in the army would serve excellently for this purpose. Engineers, chemists and similar conscripts would serve as officers, while the rest would be used in positions where unskilled labor can be used or where training will bring a man soon to comparative efficiency. So, for instance, the mining of coal may be made a matter of national service. No doubt some time must pass before such a vast scheme of labor organization can be put into execution. In the meantime, however, Germany suffers more from labor difficulties than the rest of Europe. The gas industry has offered high wages to gas empoylees and has in this manner attracted a fair number of men. But German papers complain about the irregularity of the attendance of the men and strikes are frequent.

During the recent general strike many cities saw themselves cut off from their light supply because the gas workers disagreed with the self-established Kapp Government. While this attitude may have been correct and very useful in the present case, there is no guarantee that the same means will not be employed whenever the gas workers have a grievance, and that the just will have to suffer with the unjust. Luckily the German cities have been accustomed to a good deal of inconvenience from the interruption of gas lighting in the past, and they have carried, therefore, their fate with a certain equanimity that will help much to overcome the temporary disorganization of their domestic life. Now it is proposed to bring new blood into the labor force of the gas industry by holding out the chances of early advancement and by training systematically men for the service.

Coal Situation Still Unsatisfactory

The coal miners of England having decided to take matters in their own hand and predicting trouble to any government that may not fall in with their own ideas of managing the coal mines, there is every indication of new difficulties for the English gas works. The disorganization of the English coal supply is really the most difficult of the problems with which the English gas works have to deal to-day, and there is no means of evading the issue. But conditions in England are healthy in comparison to those existing still upon the European continent. The French gas works have had a sufficient supply of coal for a few weeks, but the German works are still short all over the country, and the German coal miners have shown themselves more and more unmanageable. The recent Spartacide disturbances following the Kapp revolution have found their strongest support in the so-called Ruhr region where most of the German coal is mined at the present time.

Equipment Fails

While labor and coal supply, therefore, possibly form the most pressing problems, they are not the most dangerous to the continuation of good service. Both can be remedied immediately by bringing new labor in the industry and raising the production of coal. The gas industry of Europe, however, is attacked by a more deadly enemy in the form of deterioration of equipment. Where this deterioration appears in the overground equipment it can be dealt with comparatively easily, as it is discovered practically immediately where it occurs and repairs can be made. But five years of overexertion and neglect have caused deterioration in many places which are not so readily accessible and where the fault appears only when the destruction of equipment is practically complete. Inferior gas has hastened the corrosion of pipes, and while the leaks occur mostly in the supplementary lines there are indications that the destruction has far enough advanced as to attack the main lines. Most of these mains lie in the ground since many years and it is, therefore, very difficult to repair the leaks. Extensive street work has to be undertaken and it is not always easy to find the men for that work. Explosions have occured occasionally and it will become necessary in many instances to overhaul the line equipment of whole districts. This adds enormously to the cost of operation, and gas works may be compelled to reduce their dividends considerably during the coming years until they have replaced the failing equipment by a new one. Unfortunately this is not only a question of doing the work and paying for it, but the gas managers are finding it increasingly difficult to get the required supplies of pipes and other equipment. The factories making these materials are falling behind in deliveries because they cannot get the necessary raw materials. The iron industry is not as active as it used to be, principally owing to lack of coal, and the countries concerned have not enough money to buy abroad. America would be the only country that could send gas equipment in larger quantities, but the present exchange situation makes it practically impossible to order American goods. After all, the gas works have to look out for their future prosperity. Equipment bought at the now prevailing prices will be an enormous load upon the maintenance and deterioration expenditures in years to come, and there are few gas managers that care to undertake this responsibility unless they are absolutely compelled to do so. Consequently, much inferior equipment is carried along and there is danger that the coming spring will disclose many hidden defects caused by freezing of mains that can only be imperfectly attended to. Of course, ultimately the step of rejuvenating the equipment will have to be taken. But European gas works would see the day of reckoning rather deferred to a more suitable time.

Conserving Gas

To prepare for this event attempts are now made to increase the earnings of the gas works by raising the rates. During the war many cities had increased their rates considerably, but it seems that public sentiment is now very much averse to further raises all over Europe. Social discontent is rampant and neither cities nor governments like to add new fuel to the flame. So a great many suggestions have been made to help the gas works by other means than those of adding to the burden of the consumer. In some cases cities have contributed to the upkeep of the municipal plants, but this of course is merely a subterfuge, as the cost increase has to be covered by a corresponding increase in rates and taxes. In the meantime, it has been argued by men who have a good insight in the attitude of the consumer that the consumer does not mind so much higher rates as long as his gas bill can be kept down to about the same size as he is accustomed to. If, therefore, the price of gas cannot be kept upon the same level, there is a chance

of satisfying the consumer by assisting him in the saving of gas. A new conservation policy has been recommended in Germany and in other parts of Continental Europe that will serve the double purpose of making it easier for the gas works and reduce at the same time the load upon the European transportation system by limiting the coal consumption of the gas works. The most recommendable proposition is the complete cessation in the use of open burners. This, in consequence, has been practically forbidden in many German cities. To encourage consumers in the use of incandescent burners the gas companies themselves have undertaken to supply each consumer with a reasonable number of the latter. Also the discontinuation of all sorts of by-passes and similar aids to the use of gas has been recommended. But here the gas industry has been up against a very difficult problem of general policy. In pre-war times it has been one of the main arguments of the gas industry against the use of electrical lighting appliances, that the by-pass is giving to gas light all the advantages of electrical lighting while eliminating some of its disadvantages, and that the by-pass hardly consumes any gas at all and in consequence does not add to the expenditure of the consumer. To reconcile these former statements with the present demands of conservation is no easy matter and no satisfactory solution has been found. There is no doubt the additional difficulty that by reducing the convenience in the use of gas, the consumer may be induced to transfer his allegiance to electrical lighting. To minimize this danger ordinances have been made in some cities that during the present time no new installations will be made for either gas or electricity if this is destined to replace any of these two forms of lighting. This has been especially easy in the case of municipalities where both the gas and the electrical works were owned by the city corporation. Most gas men seem to be of opinion that a reasonable use of by-passes will not seriously affect the gas consumption, but that the consumer should be instructed to make it a rule to shut off gas whenever it is not required in the kitchen or for lighting purposes. This shutting off, it is said, is rather aided by the use of by-passes, as otherwise most consumers will be inclined only to turn low, a practice which is not only dangerous but constitutes no real saving of gas. In any case, gas men agree that the question of conservation of gas and its price must be approached as one.

During the war many gas works have found the manufacture of by-products a valuable addition to their income which has enabled them often to be more liberal in the matter of consumers' rates, as they could earn sufficient by selling by-products and equalize a possible loss in any other direction. By-product making, however, is not any more so convenient as it was during the war. Not only has the demand declined for many by-products, but profits have dwindled under the influence of high raw material prices and wages. Many by-product plants that have done well during the war had to be shut down and have become rather a liability than an asset. It is hoped that with the return of normal conditions many of these plants will be able to operate again, but it is realized that the smaller gas works will have to make great changes in their method of disposing of their by-products. Markets will have to be found for them in the immediate neighborhood of the works, so that the sale of the product does not enter into competition with the products of the larger and better-placed gas works that can undersell the smaller works whenever they desire.

No doubt the European gas industry will finally find a way out of all its many difficulties. At the present time, however, it is sorely tried and European gas men need all their wits to keep their works going under very adverse circumstances.

Discs for Slot Meters As a Rationing Measure

In Germany a scheme has been developed for replacing the 10-pfennig pieces in coin-freed meters by discs to be bought at the gas office. Most of the discs used have been larger than the coins and this has involved alterations in the mechanism which runs the money. Herr Ulrich, of Siegmar, has devised a new method. The disc itself is of the same size as the 10-pfennig piece, but has a smooth, rounded mark cut in it. A small strip of metal is soldered outside the receiving slot so as to restrict its aperture by about 0.12 in. The neck of the disc is laid on this obstructing edge. The disc readily slips through and is received by the internal mechanism as if it were a full disc of the standard diameter. In this way the mechanism does not require to be altered. The German works use these discs to enforce gas rationing, as they can limit the issue to so many per month. The price of issue can be varied from time to time.

Higher Fatty Acids from Wood Tar

According to a recent German patent, producer tar from brown coal is distilled with superheated steam at 220 to 250 deg. Cent., and the oils distilling over are freed from pitch and treated with a solution of alkaline carbonate, followed by washing with water to remove free acids. A portion of arachic acid is separated as an acid salt and can be recovered by filtration The dissolved non-acid oils are removed from the filtrate by washing with light oils, after which the higher fatty acids are thrown down by an excess of mineral acid and recovered by distillation under reduced pressure, the palmitic, oleic and arachic acid present coming over above 190 deg. Cent.

Lining for Gas Retorts

According to *Gasbelenchtung*, Herr P. M. Grempe gives the following as a good lining for gas retorts: A water-paste is made up consisting of 75 parts carborundum and 25 parts water-glass or 85 parts carborundum and 15 parts fireclay well mixed together. The deposit is allowed to stand for 24 hours and the retort is then slowly heated. A thickness of 0.5 mm. is sufficient so that about 1,200 grams of carborundum will be required per square meter of retort furnace. Linings of this paste have been found satisfactory in furnaces for coal, coke and gas firing, and flaws in the retorts may be repaired with the paste. Carborundum lining muffles have been used in the National Physical Laboratory, London, for years, but the lining of large retorts was a different thing.

Gas Sales Association of New England Discusses Ways and Means of Promoting the Sale of Water Heaters

F. K. Wells' Paper Gives Valuable Suggestions How to Develop This Branch of the Company's Business—Free Maintenance?

The regular meeting of the Gas Sales Association, of New England, was held on Friday, April 9, at the Boston City Club.

William Gould, governor, opened the meeting with the following remarks, "You will agree that a new era is reached in the gas industry of New England when I tell you that to-day I have so far attended three separate meetings of gas associations, and this is the largest of the three."

W. F. Norton, of Nashua, then spoke. "As several members of this association have expressed a desire to see our lighting installation, I wish to invite you as a body to drive up some day when the weather is a little warmer and inspect the model installation we have in a school building in Nashua. I suggest that the governor appoint a committee to arrange this trip to Nashua. Just let us know when you are coming and we will make all other arrangements"

On a motion to this effect, the governor appointed W. T. Pease, Theodore M. Piser and William H. West —a committee of three—to arrange an automobile trip from Boston to Nashua at some early date convenient to Mr. Norton.

Mr. Gould then introduced F. K. Wells, of the F. K. Wells Sales Company, Inc., who read the following paper on water heaters:

"In presenting this paper on water heaters, I am not going to burden you with any ancient history about when they were first introduced, who introduced them, how they are made or anything with relation to the manufacture of them, but will endeavor to interest you with some opinions as to certain features of the water heater business, its troubles, complaints, remedies and, in fact, all of the details that would be particularly interesting to a salesman or a gas company manager. I am not going to confine my talk entirely to automatics, but will take in their sequence —first the tank heater and its possibilities, the automatic, and then the automatic storage.

"The tank heater end of the business is an educator in itself—say for something better—and it is a mistake in my opinion that when a tank heater gives out or the coil needs brazing, not to try and sell the customer an automatic. Now and then it can be done, and it is a step in the right direction. However, in making this remark, I am not decrying the benefits to be had from a large sale of tank heaters. Many gas companies have been very successful introducing water heaters in this way in quantities by making it an object for people to put them in, giving them time to pay for them and in that way largely increasing their consumption. There is a very conspicuous example of success along this line in Pittsfield, and notwithstanding the fact that the results have demonstrated the advisability of the tank heater campaign that they conducted, yet it seems to be difficult to convince other gas managers that it is a wise thing for them to endeavor to emulate the example. That is one very singular thing about the situation to me, that when the results can be demonstrated in the gas consumption and on the profit side of the ledger there is many a gas manager and also new business man who can't see it and won't see it. Along this line it is my pleasure to read to you a letter that I received from Mr. Crafts of the Pittsfield Coal Gas Company on this particular subject which ought to be convincing, and is worth considerable thought on the part of any gas manager or new business man that is desirous of increasing his output per meter.

"In 1912 we found that we had in use one range to every 1¼ meter; but that we had one water heater to every thirteen meters, including those installed in offices, stores and factories with a gas range attached thereto while less than 8 per cent of all our meters had a water heater connected therewith. We found that this was not an uncommon average and that the same condition prevailed practically through New England.

"For the purpose of bettering this condition, we started our Rental-Purchase Plan which provided for the installation of a water heater on payment of $3 down and $3 per year until a total of $15 had been paid. We continued this for a month or six weeks every winter until 1917 when we increased the total price to $18, covering a period of six years instead of five. In 1918 and 1919 we did not conduct a campaign of this kind; but for the past four or five weeks we have again inaugurated the same, changing the methods of payment, however, to $5 down and $5 per year for five successive years or a total of $30. The results of these campaigns have been satisfactory.

"In 1912, we had a total of 536 heaters in use. Since that time we have placed on this Rental-Purchase Plan 2,312 heaters, and during the same time have sold 979, giving a total number of tank water heaters in use on our lines of 3,829 or somewhat better than one heater for every three meters in use. The fifth year payment has been made on a large number of these heaters and approximately 1,800 of these heaters have been paid for in full and become the

property of the consumer. There are still about 526 heaters which have been partially paid for.

"During all these years we have charged to our water heater rental account every expense in connection therewith, including soliciting, installation, changing location and removals, together with an allowance for collecting the annual payments and overhead expenses, and our account for this entire period shows a loss of $2,310. During this time we have not made a charge for interest on the investment. Had we charged the same at 6 per cent interest, it would have amounted to $5,016.88, so that our total expense of this entire campaign including interest and all charges of every nature would have been $7,326.88 or an average of $915.86 per year.

"From the heaters installed on this plan, we estimate an average sale of 8,000 ft. per heater per year, and the aggregate sale of these heaters during the time they have been installed on this basis would be 119,388,000 ft.

"These heaters were all installed in connection with meters already in use for other purposes, and if we figure a profit of 20 cents per 1,000 ft. we would have net profits from this installation of $23,877.60 from which should be deducted the above cost of $7,326.88, leaving a net profit on these heaters of $16,550.72; with all these heaters installed and in use and giving us a consumption of approximately 20,000,000 ft. per year.

"However, this paper is not intended for the boosting of the tank-water heater game in particular, excepting as an educator for the use of something better, and that something is the automatic.

"The automatic water heater of any make needs no explanation from me as to its worth. You are all as familiar with it no doubt as I am, but still the subject is a very interesting one to the new business department of many gas companies, and of considerable less interest to others, and all of the salesmen of water heaters no doubt have their own opinion as to the shortcomings of some gas man in pushing automatics. There is an inclination on the part of some of them to dodge the matter because they do not understand its mechanism, and haven't any men who do or who seem to be willing to learn, but if they do take it up in earnest they find it a satisfactory means of increasing consumption, and it is an all-year-round proposition, and rightfully so, for there is no gas user but who likes the convenience of being able to get hot water any minute of the twenty-four hours and is willing to pay for that privilege.

"The most serious question to discuss—that is at least to the water-heater man—is how to get more of them sold, and how to develop this branch of the gas company's business.

"First—How and where to find your customer for automatic water heaters.

"Second—To interest a prospect and land the order.

"Third—The capacity of a heater that is best to sell.

"We all know who ought to have automatic heaters, and the difficult part of it is to get the possible customer interested up to the point of buying. There has always been one disadvantage in selling automatics, for the selling expense to the manufacturer is very high. The publicity cost is enormous because the public have had to be educated up to the use of the automatic, and it has been to the credit of the different manufacturers that they have been willing to spend so much of their own money for publicity, which directly and indirectly is of great benefit to the gas fraternity as a whole. This publicity matter brings in a large number of inquiries and a great many of them are good prospects that are eventually landed. A great many of these inquiries are from people who haven't any gas in their locality and never would have. They send in a card asking for printed matter because they like to have a lot of mail delivered to their house. We have had inquiries from places that never had gas and probably would not know the smell of it if it were there. However, that is all a part of the game and we have to take the bad with the good.

"The best place to find your customers depends altogether on the size of the town. In the smaller and middle-size cities the bulk of them are in use in private houses. Occasionally you find some in drug stores, ice cream parlors, etc., and now and then one in a factory where they want hot water for washing-up purposes.

"The real estate dealer is also another man that you should not overlook, because they are changing tenants, remodeling homes and making changes that a tenant demands before closing a lease. No tenant that has been accustomed to automatic hot-water service will be satisfied with anything excepting a continuous supply of hot water at all hours.

"The best man, of course, and the one primarily who is of most use to the hot-water heater manufacturers, is the architect, and there to a certain extent we are up against trouble. You will notice I say to a certain extent. It is difficult to get an interview with the average architect, particularly in cities the size of Boston, New York, Philadelphia or any large city, for as a rule they are very busy men and will not take up their time with a salesman or demonstrator of any line unless it is something that happens to be required for some particular job at the time. However, the architect is primarily the man to see, for if you can get him to specify an automatic water heater he will in most all cases include them thereafter for the average home. After that it is up to the water heater man to see the plumbing contractor and get his order. Most every place of business should have hot water, and in my opinion it will not be many years before its use in offices, stores, etc., will be universal. You will notice it has become mandatory among druggists, ice cream and soda water parlors to have all of their glasses and everything in connection with their business thoroughly cleansed and sterilized with hot water; and they should be. And don't forget that every private residence of any size in your territory is a prospect, provided the owner is the occupant.

"Now, in connection with the automatic water heater game, I want to bring to your attention, from the standpoint of the manufacturer and distributer, a lot of troubles we have in connection with the business which are caused wholly by ignorance or indifference, or both. When I tell you that one architect that I can recall specified a small heater of 1½ gal. per minute capacity for a house with three bathrooms, you can understand why I say that troubles are caused through ignorance. Now, the average architect certainly ought to know better than to expect a heater of 1½ gal. per minute capacity to supply any house with three baths. As a mat-

(*Continued on page* 413.)

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SIXTY-FIRST YEAR

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As the Journal Views It

At the Prohibitive Point

An acquaintance had been contemplating the purchase of a certain catalogued manufactured product for somewhat over a year. Every so often he obtained a copy of the most recent catalogue. Each time the price was changed—upward. A couple of months ago he secured a final catalogue. The price, as usual, was higher. He hesitated a few weeks, and decided to make the purchase. He sent in his order and a check. The next week's mail brought him back his order and his check with a courteous note explaining that the price had again gone up; so there could be no misunderstanding they were returning his check, but if he desired to purchase at the new price they would be very happy indeed to serve him. The product had a selling value well over a hundred dollars. The price lift was less than ten. But our acquaintance tore up the correspondence, recredited the check to his account and definitely and finally dismissed the article from mind. It had attained a point in cost where he could not see where the advantage in acquisition was worth to him what the price had gotten to be.

No one denies that domestic service is a tedious, arduous work. People of moderate means will stretch their income a long way to avoid doing this work themselves. These domestic workers, many of them —perhaps the majority—are of low-grade intelligence, industry and efficiency, have attained a scale of compensation that would have made the eyes of the young technical worker of a few years ago glisten. As the wage scale went up the number of purchasers of such services dropped down in jumps. The "over-

sold" plaint of domestic labor-saving machinery manufacturers, the unfamiliar names and marks that are beginning to advertise widely, are an indication that the prohibitive point in wages to domestic servants is reaching rather high up in the ranks of those we hitherto deemed the opulent. Salesmen for such devices who worked, and worked hard for the sale of a single machine, are being surprised these days by lump orders for complete equipments. This unquestionably is the field of excessive demand of the day. How many fewer jobs must there be for domestic workers to-day. How rapidly their opportunities of employment must be dwindling every day. And when the break comes, when jobs are numerously fewer than workers, compensation standards will not topple with reason, be proportioned to living costs and price standards, but in proportion to the eagerness of that overflow out of jobs to get into jobs. Domestic workers blindly allowed their compensation demands to approach the prohibitive point.

Last winter automobile vendors were bubbling with complacency. They expected a sales volume that would be only limited by the ability of the factories to turn out the cars. And they had a right to so estimate. John Jones had a sum of money laid aside and he was positive and frank in the statement of his intention to buy a car. But John had to wait his turn, or perhaps he wanted to be definitely assured that there *was* going to be a summer before he bought a summer car. Meantime, prices kept bumping up. And cheerful tidings came of how much a gallon of gasoline is going to cost. John, meantime, is growing scary. He begins to doubt if, after all, he can afford an automobile. And the automobile vendors are getting a little dubious about that banner market. The buying ardor seems to be dwindling. To a good many people, who were potential purchasers six months ago, the purchase price and upkeep cost of an automobile have come to the prohibitive point.

We have alluded in these columns to the attitude of manufacturers that woolens have attained a price that is about all people can or will pay whether they want or need woolens or not. Further demands of labor will not be met. The mills will shut down instead. There is no use producing if the goods cannot be sold. Perhaps we have cited the instance where a certain class of labor in a certain city struck until it got a new high wage scale set. Up to that moment there was work for every worker in that line that wanted employment. With the establishment of the new scale there was work for only half. The volume of buyers who could afford to build was cut in half. Fifty per cent of the workers in that line are idle to-day getting nothing so that the other 50 per cent may revel in a wage scale that has passed the prohibitive point.

A National Association of Contractors will meet to discuss the causes underlying present high costs of construction. Like other employers these citizens met excessive demands by compromise so long as they could "pass the buck" on to the consumer. But the point has been reached that is beyond the consumer's willingness or ability to pay. And the business of these contractors is being curtailed.

Other instances could be cited. These are enough to bear out the point.

Regardless of how much it costs to mine coal, regardless of how much profit the operator is entitled to, the price of coal cannot go beyond that point where the consumer will go out and hustle in wood rather than pay it or adopt some other expedient to do without or curtail. There is a prohibitive point in the price of any commodity or form of labor, beyond which it is not worth buying.

We are beginning to learn where the prohibitive point actually lies in various fields of endeavor. Day by day and week by week we will learn where it lies with still others.

This is a healthy sign. As a people we are, perforce, emerging from the madness.

As these discoveries increase in number there will be a stabilizing in costs and prices. We may not actually be on the threshold of lowering prices, but we are at least near the end of daily skyrocketing.

Those hard, mercenary, old railroaders of a generation or more ago were able to judge in advance "what the traffic will bear" and avoid pitfalls by not getting too near it. We superior folks of to-day, seemingly, must stub our toes on it before we even learn there is such a thing as the prohibitive point.

Tending to a Unified Utility Industry

Time was once that bitter competition placed the gas industry and the electric industry very far apart.

A definite trend has set in to bring them very close together, indeed. The gas industry and the electric industry face many problems in common; have many interests in common.

During the war, because of this, the two industries were able to have a common representative committee in Washington to look after their several interests instead of each industry maintaining its own committee.

Some months ago there was described a combination lighting installation that, with his old-time offishness, the gas man could not have hoped to have secured even a share in. And if electric lighting had secured the business exclusively a considerably less satisfactory situation would have resulted. There were rooms and locations that made the convenience of control of electric lighting almost an essential. There were other locations where the steadiness and eye-sparing qualities of gas lighting were a most desirable feature. Either

industry, seeking to monopolize the business, would have made a less generally satisfactory installation. By harmonizing the two each illuminating agency got a good-sized business, and the customer an almost ideal lighting installation.

Both industries are in the great majority privately owned public utilities. And privately owned public utilities for want of good-will publicity have to a greater or less degree been maligned to the point of an almost complete loss of public sympathy. The great task ahead of both industries is to educate the public into the real facts of private operation of public utilities and so win back its sympathy, co-operation and understanding.

An interruption to the electric service under these circumstances is not a feather in the cap of the gas man; something to gloat about. Rather it is a direct blow between the eyes, representing as it does a falling short in perfect service.

The achievements of the electric industry are a boost to the gas industry and vice versa, for every good thing that is accomplished by either is a further justification of private ownership of public utilities.

But the relation of the one to the other is not confined merely to the intangible.

Of recent times the electric people are adding vastly to their load in the field of domestic labor-saving devices.

A machine that is being sold quite freely is an ironing machine. For some reason this is generally regarded as an electrical device and sold almost exclusively by electric people. As a matter of fact, to the superficial glance at least, it is more of a gas device. Electricity turns a long, padded roll that presses the washed goods against a flat back of iron. But along that iron is a long perforated pipe burner that uses gas. The amount of electricity this machine consumes individually must be practically negligible. The amount of gas consumed during the period it is in use would represent a very worth-while quantity. In this device the gas man and the electric man have a tangible interest in common.

The greater proportion of the laundry machines being sold possibly are exclusively electrical. But the housekeeper who does not have gas water-heating thermostatically controlled loses a good part of the convenience the machine represents to her. Thus we can well imagine, if he is gifted with common sense, the electric clothes-washing machine salesman's eyes glisten every time he sees a gas water heater going into a home where he has not yet sold one of his machines. The chances of a trial installation resulting in a real sale are immeasurably improved. And vice versa the installation of an electric clothes washer hastens by just so much the time when the housekeeper feels the need of thermostatically controlled gas water heating to an acute enough degree to part willingly and eagerly with the sum of money necessary to obtain it.

The same reasoning follows for the electric dish washer. Though not one foot of gas may be consumed by the device itself, yet in the working out it boosts the gas company's cause enough even to provide an incentive to it to actually push the sale of such installations. And a home without gas must indeed be a hard customer to secure for the electric man selling such devices. The old-time water back will not provide that very hot water that enables the electric dish washer to do its work most efficiently. The water that washes the dishes in these machines does not have to touch human hands. Hence there is no limit, from the point of view of use, to the intensity with which the water may be heated. And, of course, the hotter the water the better able it is to assist in removing the kind of soil that attaches to dishes. For the gas man the electric dish washer represents an excellent lift towards selling more gas. To the electric salesman the availability of gas enhances the convenience and efficiency of his dish-washing device, and without it available he cannot hope for complete satisfaction with the installation.

The gas man and the electric man are being brought to the point of working shoulder to shoulder together. Competition between them is dwindling in proportion to their increasing interests in common.

Synthetic Ammonia

The *Times*, of London, states that the problem of establishing in that country the manufacture of ammonia synthetically and thus making Great Britain independent of Chile for supplies of saltpeter and the nitrates necessary for making high explosives as well as for fertilizers, has been settled by a group of firms taking over the factory at Billingham-on-Tees. The erection of the factory was decided on by the Ministry of Munitions in 1917. The negotiations are said to be almost completed.

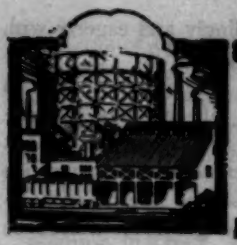
Consolidated Has 8,275 Stockholders

The Consolidated Gas Company of New York has 8,275 stockholders. There are 1,335 stockholders who hold from one to nine shares each; 2,704 who own from 10 to 25 shares each; 1,371 stockholders who own 26 to 50 shares each; 1,305 stockholders who own from 51 to 100 shares each, and 1,560 stockholders who own 100 shares each, or more.

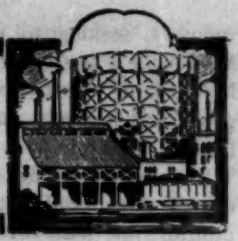
In the Gilding of All Articles from Statuary to the Edges and Lettering of Books Gas May Well Have a Considerable Part

(*Continued from page* 399.)

a proper consistency and laid on by a brush with the white of an egg. This coating, when dry or nearly so, is smoothed by the burnisher. It is then slightly moistened by a sponge dipped in clean water and squeezed out, after which the gold leaf is applied and the rest of the process is as before.



NEWS OF THE GAS INDUSTRY



Court Issues Order in Consolidated Gas Suit

Judge Mayer has issued an order requiring the city and State authorities of New York to show cause, on May 26, why an injunction should not be issued in favor of four New York gas companies, restraining these officials from enforcing the 80-cent gas law.

The companies involved, subsidiaries of the Consolidated Gas Company, are the Standard Gas Light Company, Mutual Gas Light Company, Central Union Gas Company, and Northern Union Gas Company. This is the initial proceeding by these companies in their fight to have the present State gas law declared unconstitutional, on the ground that it does not permit a fair return and is confiscatory.

Argument on the motion for the injunction will be heard before Judge Ward, of the Circuit Court of Appeals, and Judges Mayer and Hand for the United States District Court.

Judge Mayer has not as yet rendered his opinion on Special Master Gilbert's report in the suit of the Consolidated Gas Company to have the present gas law invalidated. The report was a sweeping victory for the company, the master finding that the law is confiscatory and recommending that the company is entitled to an 8 per cent return on about $75,000,000 of property valuation.

Action on this report is expected in the near future, and should the court confirm the findings of the master the company would obtain a permanent restraining order against the enforcement of the 80-cent law.

THE LOS ANGELES GAS & ELECTRIC CORPORATION, Los Angeles, Cal., has been authorized by the railroad commission to issue $1,500,000 of bonds to be deposited as security for $1,000,000 of four-year notes. The money is to be used in part to pay for extensions and betterments, the commission announced.

Several Hundred Representatives of Gas Companies Discuss Coal and Oil Situation

So serious is the present shortage and threatened famine in oil and coal that representatives of several hundred gas companies throughout the United States met in New York City, May 17, to discuss ways and means of meeting this great emergency that so vitally affects the living conditions of forty-five million people in every section and every community of the entire country.

The real menace to the public in general as well as to the gas industry was revealed in the oft-repeated declaration that the problem first to be met and solved everywhere is that of a continuation of service by gas companies. So acute has the situation grown in many localities that manufacturers of gas are face to face to-day with the proposition of closing down their plants unless they immediately can obtain gas oil and coal.

It was repeatedly and emphatically pointed out that anything approaching a cessation of service would prove an actual calamity to consumers of gas in that it would produce a crisis amounting almost to starvation.

Figures were cited showing that many millions of families depend entirely upon gas for cooking as well as lighting purposes. It also was shown that it would be impossible, in case of any discontinuance of gas service, to provide quickly enough other means of cooking food to ward off actual cooked-food deprivation.

One of the points widely discussed was that of asking the Interstate Commerce Commission for priority of shipments and allocation of oil and coal. Another was the advisability of a representative body of gas manufacturers appearing before the proper authority at Washington to urge that a check be put at once upon the tremendous exports at this time of both coal and oil. Both these questions will be discussed fully at a conference of eleven hundred gas company representatives called to meet in New York City on May 26. This conference will be held at the Hotel Pennsylvania and at the sessions the whole gas industry situation, with all its various threatening phases, will be threshed out in detail and a definite plan formulated to combat the daily increasing liability that gas service in many localities will have to be cut off because of the shortage of gas-making raw materials.

It is confidently expected that this conference will be largely attended. Representatives of gas companies from coast to coast and from the North and South have promised they will be present.

Another direct result of the meeting was the formation of an Emergency Committee of the American Gas Association. This committee issued the call for the May 26 conference. In the meantime, its members will map out a series of suggestions to be acted upon by the gas industry generally. Among those who attended the meeting were:

George B. Cortelyou, American Gas Association, New York, N. Y.

Randal Morgan, United Gas Improvement Company, Philadelphia.

George H. Waring, American Public Utilities Company, Grand Rapids, Mich.

Howard Bruce, the Bartlett Hayward Company, Baltimore, Md.

Arthur E. Childs, Massachusetts Lighting Companies, Boston, Mass.

Charles M. Cohn, Consolidated Gas, Electric Light & Power Company, Baltimore, Md.

C. L. Holman, Laclede Gas Light Company, St. Louis, Mo.

Sidney Mason, Welsbach Company, Gloucester, N. J.

B. J. Mullaney, Peoples Gas Light & Coke Company, Chicago, Ill.

George D. Roper, Eclipse Gas Stove Company, Rockford, Ill.

Henry D. Schall, Detroit Stove Works, Detroit, Mich.

Robert M. Searle, Rochester Gas & Electric Corporation, Rochester, N. Y.

E. N. Wrightington, Boston Consolidated Gas Company, Boston, Mass.

Henry G. Bradlee, Stone & Webster, Boston, Mass.

T. R. Beal, Central Hudson Gas & Electric Co., Poughkeepsie, N. Y.

A. P. Lathrop, American Light & Traction Company, New York, N. Y.

City of New Orleans Files Suit to Take Gas Company

Expropriation proceedings against the property of the gas light company of New Orleans, La., has been begun by the city. This is in accordance with a resolution by the commission council, several weeks ago, and the purpose is to acquire the system in order that the city may put in natural gas.

It will be recalled that the city tried to purchase the property in question from the New Orleans Railway and Light Company, but the company asked a higher price than the city's engineers thought reasonable.

The appointment of six commissioners is asked, to appraise the value of the property.

The petition shows by Act No. 3, General Assembly of the State of Louisiana is granted the right to expropriate any electric light, gas or water works belonging to any firm or person or corporation whenever deemed necessary for public interest by the mayor and council of the municipality.

Article No. 4, of the petition—"That, whereas, the combined natural and artificial gas system publicly owned and maintained, operated and managed for the use of the city of New Orleans is a prime necessity to said city.

"The city of New Orleans desires to acquire, and is rendered the imperative necessity of acquiring aforesaid gas system, rights and franchise of the New Orleans Gas Light Company.

"That the commission council of New Orleans and the New Orleans Gas Light Company cannot agree on the prices which the city should pay for the aforesaid gas system, rights and franchise of said company, the city of New Orleans has therefore instituted this suit."

THE CRISFIELD LIGHT & POWER COMPANY, Crisfield, Md., will increase the price of gas in Crisfield from $2 to $2.50 per 1,000 cu. ft. beginning June 1.

U. S. Civil Service Examination for Specialist in Natural Gas Conservation

The United States Civil Service Commission announces an open competitive examination for specialist in natural-gas conservation. A vacancy in the Bureau of Mines for duty in the field, at $3,160 to $2,500 a year, and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion.

The entrance salary within the range stated will depend upon the qualifications of the appointee as shown in the examination, and the importance of the duty to which assigned. Appointees whose services are satisfactory may be allowed the temporary increase granted by Congress of $20 a month.

All citizens of the United States who meet the requirements, both men and women, may enter this examination; appointing officers, however, have the legal right to specify the sex desired in requesting certification of eligibles. For the present vacancy female eligibles are desired.

The duties of the appointee will be to demonstrate, give lectures on and teach the most efficient use of natural gas and gas-burning appliances in the various natural-gas using cities of the United States.

Applicants must have graduated from a college or university of recognized standing, and, in addition, must have had at least six months' actual experience in lecturing on and demonstrating before audiences the efficient use of natural gas and gas-burning appliances. Additional credit will be given for special study in home economics work.

Applicants must have reached their twenty-first but not their fortieth birthday on the date of the examination.

Applicants will be admitted to this examination regardless of their residence and domicile; but only those who have been actually domiciled in the State or Territory in which they reside for at least one year previous to the examination, and who have the county officer's certificate in the application form executed, may become eligible for permanent appointment to the apportioned service in Washington, D. C.

Applicants should at once apply for Form 2118, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C.; the Secretary of the United States Civil Service Board, Customhouse, Boston, Mass., New York, N. Y., New Orleans, La., Honolulu, Hawaii; Post Office, Philadelphia, Pa., Atlanta, Ga., Cincinnati, Ohio, Chicago, Ill., St. Paul, Minn., Seattle, Wash., San Francisco, Cal.; Old Customhouse, St. Louis, Mo.; Administration Building, Balboa Heights, Canal Zone; or to the Chairman of the Porto Rican Civil Service Commission, San Juan, P. R.

Applications should be properly executed, excluding the medical certificate, and must be filed with the Civil Service Commission, Washington, D. C., with the material required, prior to the hour of closing business on June 22, 1920.

Gas Company to Build Wharf

The Newburyport Gas & Electric Company, Newburyport, Mass., is accumulating some large piles which are to be used in the construction of a wharf that is to be built near its power station. The wharf will be used for docking vessels that are to bring a supply of oil and coal for the company's purposes.

The foundations for the 10,000-gallon and the 1,000-gallon oil tanks have been completed and the foundations for the big pipe lines are nearly in place. A substantial dam has been built on three sides of the tank foundations to catch the oil should it from any cause be released from the tanks and to prevent it spreading to adjoining property and out onto the waters of the river. The tanks have not arrived.

Minneapolis Gas Company in Hands of Receiver

The Minneapolis Gas Company, Stillwater, Minn., is in the hands of a receiver. The company was furnishing gas before the failure at the rate of 85 cents a 1,000 ft. Three experts are working on the problem of adequate compensation, who, it is understood, will name a price between $1.15 and $1.25 a 1,000 ft. There's no doubt, with the increased cost of labor and coal, it costs more to make gas than ever before.

Pennsylvania Ranks First in Recovery of Gasoline from Natural Gas

Pennsylvania now ranks first in the entire United States in the importance of her gasoline recovery plants from natural gas, according to the report just made by Dr. George H. Ashley, chief of the Bureau of Topographic and Geological Survey of the Pennsylvania Department of Internal Affairs. In eight years the Keystone State operations for gasoline recovery have been developed from practically nothing to the present commanding position. In the report Dr. Ashley points out that while in 1911 less than 7,500,000 gal. of gasoline were recovered there had been treated 450,000,000,000 ft. of natural gas in 1918. The report continues:

"During the eight years more than one trillion cubic feet of natural gas was treated. In 1911 there were 176 recovery plants in nine States. In 1918 Pennsylvania alone had 282 plants, or more than any other State; Oklahoma had 276, West Virginia 202 and the other States from 72 plants on down."

Pennsylvania, while first in the number of recovery plants, stands fourth in gasoline production. Oklahoma produced 163,000,000 gal., using 78,000,000,000 cu. ft. of gas with an average recovery of 2.09 gal. per 1,000 cu. ft. Pennsylvania obtained 0.27 gal. from each 1,000 cu. ft. The aggregate value of the Pennsylvania recovery was $3,248,233, an average of 20½ cents per gallon. Of the amount recovered 58.1 per cent was by the compression process and the remainder by absorption. Dr. Ashley says that the removal of the gasoline from the gas results in a positive benefit to the gas consumer in that the gas is dried and obstacles to free distribution thereby are removed.

Dallas Company Seeks $140,000 for Improvements

Permission to borrow $140,000 for the purpose of making needed extensions and additions is asked by the Dallas Light & Power Company, Dallas, Texas, in an application to the Board of City Commissioners.

The light company proposes to put up $175,000 of the $500,000 thirty-year 6 per cent bonds now held in the company treasury, as agreed with the commission when they gave the company authority to issue $5,000,000 bonds and $1,500,000 preferred stock June 30, 1919, for collateral to protect the lenders on their two-year 7 per cent notes, and also asks for authority to sell the $500,000 bonds when the notes are paid.

The application has been approved by City Attorney James J. Collins as to legality, and Supervisor of Public Utilities John W. Everman has recommended the approval of the application to the board of commissioners.

U. G. I. Urges Conservation of Crude Oil

The United Gas Improvement Company, of Philadelphia, Pa., which recently asked its patrons to restrict the use of gas because of congestion in the supply of its raw materials, among them crude oil, is now proposing to conserve crude oil by asking that the candle-power standard of its illuminating gas imposed by various communities which it supplies be changed to a heating standard. President Samuel T. Bodine of the gas company appeared before a meeting of stockholders recently and explained that crude oil was used to increase the candle-power of the gas, but that since all incandescent burners, gas stoves and many other devices for gas consumption depend on heat, not candle-power, for efficiency, the consumer really will be benefited if the heat unit is raised and the candle-power decreased, and if oil consumption for the gas thereby can be obviated the company will be able to save annually from 50,000,000 to 60,000,000 gal. of crude oil.

Natural Gas Earnings

Earnings of the Canadian Western Natural Gas, Light, Heat & Power Company, Calgary, Alberta, for February, 1920, amounted to $96,285, compared with $127,214 in the same month of 1919, a decrease of $30,929. From October 1 to February 29 the aggregate earnings were $547,522, or a decrease of $44,476 from the figures for the corresponding period in the previous year.

The company is still carrying on its drilling operations in the Barnwell field. At last report the latest test there was down 2,060 ft., and it was hoped that gas would be found at 2,150 ft. Much difficulty has been experienced in securing delivery of tools and materials.

Increased Rates for Six Massachusetts Towns

The Malden & Melrose Gaslight Company, Malden, Mass., has advanced the price of gas from $1.25 per 1,000 cu. ft. to $1.50. The new rate took effect May 15.

Heretofore a 5 per cent discount has been allowed for prompt payment, but now this discount has been abolished. The company serves Malden, Melrose, Everett, Medford, Reading and Stoneham. The cause of the increase, according to the company, is the advance in the price of oil and coal.

New Gas Field in Canada Being Tested

A potential new gas field near Lambton County, Ontario, is being tested by Leo Wilson & Co., of Petrolia. A test for oil at Blackwell drilled some years ago finished as a gasser and was plugged, the operators having no market for the gas at that time. Mr. Wilson has opened and cased the well, securing an estimated flow of 500,000 cu. ft. a day, the production coming from a sand at 470 ft.

In the Dover field, Kent County, Petrol Oil & Gas Company well No. 2 got a show of gas, about 50,000 cu. ft., at 2,916 ft. This is only 12 ft. in the Trenton limestone and the nearest to the top that gas has been found in the Trenton anywhere in the Dover field. Usually a first gas show is encountered between 35 and 50 ft. in the Trenton, and the main sand a couple of hundred feet deeper. No. 2 is being drilled deeper for a larger production.

In Norfolk County the Dominion Natural Gas Company is reported to have located a test at Houghton. Last year the company spent about $100,000 in deep tests on Long Point, but though gas showings were encountered in all the wells no commercial production was secured.

THE MARLBORO-HUDSON GAS CO., Marlboro, Mass., has petitioned the Public Utilities Commission for a hearing on an increase in the price of gas. At present the company charges $1.75 per 1,000 cu. ft., with rebate features that bring the price down to $1.65. Although no definite increase is named, it is understood to be 20 cents.

Ohio Company to Be Known as the Pure Oil Company

The board of directors of the Ohio Cities Gas Company, Columbus, Ohio, at a meeting at Columbus approved a proposition to change the name of the company to "The Pure Oil Company" and decided to leave final decision to the stockholders. A regular quarterly dividend of one dollar a share or 4 per cent quarterly, was approved by the board on common stock, payable June 1 to stockholders of record May 17.

Permit New Gas Rates in Plymouth and Worcester

The Department of Public Utilities has approved a petition of the Plymouth (Mass.) Gas Light Company for a new scale of rates. Under the new scale the rate per 1,000 ft. remains at $2.75, but the rate for less than 1,000 ft. has been increased and that for more than 1,000 ft. reduced. The new scale calls for 85 cents for the first 100 ft. and graduated increases for each additional 100 ft. up to 1,000, while a net charge of 20 cents will be made for each 100 ft. consumed beyond 1,000.

The commission granted also an increase in rate to $1.50 per 1,000 cu. ft. of gas to the Worcester (Mass.) Gas Light Company. The company had asked for a rate of $1.65, while the city of Worcester thought $1.45 was enough.

The commission also approved a request of the East Boston Gas Company for permission to issue 13,000 shares of new capital stock, par value $25 a share. The proceeds of the issue are to be applied to the cancellation of an equal amount of the company's promissory notes outstanding Feb. 29, 1920.

Gas Plant Sold

The Smyrna gas plant, Smyrna, Del., has been sold by C. Raymond Cummins, owner to Paul J. Rutan, local representative of the Charles Warner Company, of Wilmington. Mr. Rutan took possession May 1.

The local plant was run down and the service inefficient, and the ownership has changed hands several times during the past few years. At one time a movement was under way to have the town buy the plant and run it in connection with the Smyrna new municipal electric plant. As soon as conditions warrant, Mr. Rutan intends adding to the size and equipment of the plant, extending the pipe lines, probably to Clayton, and make other improvements badly needed.

Gas Company Officers Are Re-elected

Directors and officers of the Sandusky (Ohio) Gas & Electric Company were re-elected at the annual meeting of the stockholders. Directors are W. S. Barstow, L. H. Tyng and J. B. Taylor, of New York City; Emory Thierwechter, of Oak Harbor; George A. True, of Port Clinton; F. K. Woodring, of Toledo, and C. B. Wilcox, of Sandusky. The officers are: Chairman of the board, C. B. Wilcox; president, W. S. Barstow; vice-president, J. B. Taylor; treasurer, John T. Clark; secretary, J. P. Campbell; assistant secretary, A. H. Buderer.

Ohio Cities Gas Company Earnings Increase

The Ohio Cities Gas Company, Columbus, Ohio, reports for the year ended on March 31 a surplus income, after all charges and Federal taxes, of $10,448,598, equivalent to $5.33 a share, earned on its outstanding common stock, after deduction of preferred dividends, against a surplus of $9,536,567, or $4.93 a share, earned in the last preceding year on its common stock.

Gross earnings for the year were the highest in the company's history, totaling $54,304,091, against $47,422,890 in the immediately preceding year. Costs and operating expenses aggregated $40,339,796, against $33,025,858, making net operating earnings for the year $13,964,295, against $14,397,032. For Federal income and excess profits taxes $1,489,592 was set aside, against $2,151,177, and interest charges amounted to $324,953, against $403,304, and depreciation writeoffs to $1,701,202, against $2,305,984. Preferred dividends totaled $525,000 and common dividends $7,334,163, leaving a balance to surplus for the year of $2,589,434, against $1,713,848.

The best business of the year was done during the last six months, according to B. G. Dawes, president of the company. At the present time, he adds, earnings are the largest in the company's history and the operating organization has been brought back to normal by the return of men who went to war. "There was a slight decrease in the business of the company during the first half of the fiscal year," Mr. Dawes said, "but during the last half the business and profits of the company have shown a rapid increase, leaving the results better than the previous year. At the present time the earnings are the largest in the history of the company, and by the return of many employees who were in the war our operating organization is back to normal.

"The capital expenditures and investments made during the last fiscal year amount to $16,917,081, the principal items of which consist of the purchase of the Moore Oil Refining Company, a substantial investment in the Union des Petroles and Oklahoma Producing & Refining Corporation, the building of the Health Refinery with adequate storage and tank-car equipment, purchase of oil-producing properties in Ohio, West Virginia and Oklahoma, and the erection and purchase of distributing plants. The funded debt of the company during the year was reduced $1,299,000."

Fire Causes Heavy Damage at Aberdeen Gas Plant

Fire broke out at the gas plant of the North Pacific Public Service Company, Aberdeen, Wash., and destroyed the large coal bunkers and other buildings.

The blaze, which was spectacular, was soon controlled by the city fire apparatus, which responded to the call. But little of the gas-making machinery was damaged, and the city supply was restored the following morning.

The fire was caused by the bursting of a seal of an exhaust pipe. The exhaust gas caught fire from a pilot light, and the flames spread almost instantly through the plant. The prompt action of the fire department prevented the explosion of an adjacent gas tank in which a quantity of gas was stored.

THE COLLINSVILLE GAS COMPANY, in an application filed with the Corporation Commission asks for an increased gas rate. The company is now charging 35 cents per 1,000 and wants 50 cents, with discount.

New Charge System for Gas Approved

An unusual charge system for a gas utility has been put into effect for the Brazil (Ind.) Gas Company by an order of the public service commission.

The company is authorized to collect a "demand charge" of $1.20 a month for a three or five light meter, a charge of $1.75 for each larger meter, and to collect a "consumption charge" of 12 cents per 100 cu. ft. of gas used.

The demand or primary charge is to care for fixed charges, such as depreciation, taxes and return on investment. The consumption or secondary charge is to care for operating expenses.

Electric utilities in a number of instances make collections under this system, but this is the first gas utility in the State to operate in such a manner. The customary plan of gas utility operation is to charge a certain rate for 1,000 cu. ft. of gas and to charge a certain monthly minimum. In support of its application of the new plan to gas utilities the commission in its order stated:

"Every consumer, both large and small, pays exactly the same amount for gas actually used.

"Each consumer pays actually the amount of the necessary overhead charge to which the company is put in order to be ready at all times to serve the community.

"As the amount of gas consumed increases, the average cost per 1,000 cu. ft. decreases to the consumer.

"As new consumers are added the primary charge can ultimately be reduced. The amount of taxes, depreciation and return remain substantially the same, and in proportion as the number of consumers increases, the amount of this service charge a consumer will decrease in the same ratio."

A 7 per cent return on a valuation of $140,000 will result from the new rate schedule, the commission believes.

Nineteen Gas Wells Completed in West Virginia

Nineteen gas wells were completed in West Virginia during the past week, the largest of which is reported to have a capacity of 3,500,000 cu. ft. per day. Much of the gas which is now being produced in this State is being held in reserve, the wells being shut in during the summer and turned into the lines in the winter, when the "pull" on the lines is much greater. The one big well of the week was that of the United Fuel Gas Company on the F. Walker farm in Roane County.

P. S. Commission Grants Elmira Gas Rate Increase

The Public Service Commission has fixed the rate to be charged the Elmira and Southport, N. Y., natural gas consumers by the E. W. L. & R. R. Company at 54 cents per 1,000 ft., an increase of 1½ cents per 1,000 ft. The present rate is 52½ cents per 1,000 ft. The decision also fixes the rate for each meter at 60 cents a month. If a bill is not paid within ten days an excess of 5 cents per cu. ft. may be charged by the company.

The new rate will go into effect five days after the serving of the notice, and is fixed for a period of one year, and until further order of the commission.

The Elmira Water Light & Railroad Company petitioned the commission about a year ago to be permitted to charge each consumer a sliding scale for natural gas, beginning at 85 cents per 1,000 ft. for the first 2,000 ft; $1 per 1,000 for the next 8,000 and $1.10 per 1,000 for all consumed above that amount.

Public Service Companies of New Jersey Pay $1,617,226 Gross Taxes

The Public Service Railway, Gas & Electric Companies, of New Jersey, will pay $1,617,226.41 in taxes on their systems throughout the State under the gross receipts law in lieu of personal tax and in addition to the 5 per cent franchise tax and real estate tax. Divided under the three headings the tax will be paid as follows: Railway, $643,223.10; gas, $413,072.21, and electric, $560,931.10.

Of this Newark's share will be as follows: Railway, $155,647.01; gas, $59,118.44, and electric, $139,589.29. Essex County's division of the total is as follows: Railway, $230,218.85; gas, $85,864.57, and electric, $209,956.37.

THE DEPARTMENT OF PUBLIC UTILITIES has authorized the Lowell Gas Light Company, Lowell, Mass., to issue at $150 per share, 2,000 additional shares of stock of $100 par.

Edward Bemis Chosen to Investigate Gas Supply

Edward W. Bemis, former commissioner of water for Cleveland, Ohio, and now head of an engineering firm with offices in Chicago and New York, has been engaged as the city-suburb gas expert to make a detailed appraisal of the gas fields of West Virginia, where the Hope Gas Company has wells supplying the East Ohio Gas Company, and assist the city and suburbs in negotiating renewal franchises.

The result of the work will effect practically every household in the county, as the company is asking an increase from 35 cents to at least 80 cents by October and to $1.25 by February, when the city franchise expires, basing its claim principally on a shortage of gas necessitating increased rates to conserve supply.

Mr. Bemis is now representing the city of Chicago in its rate adjustment, after making an appraisal, and is advising in the Consolidated Gas case in New York. He just completed surveys of the Pennsylvania Gas Company for the cities of Erie, Corry and Warren.

Portland Gas Earnings

Although operating expenses of the Portland Gas & Coke Company, Portland, Ore., in March were 20 per cent greater than for the corresponding month of last year, the net earnings showed a gain of 8 per cent. For the period of twelve months to the end of March, there was an increase of 20 per cent in operating expenses, with 11 per cent in net earnings compared with the preceding yearly period.

Following is a summary of the report to shareholders:

Gross earnings, March, 1920, $200,332; twelve months, $2,254,573.

Operating expenses, March, 1920, $120,812; twelve months, $1,310,134.

Net earnings, March, 1920, $79,520; twelve months, $944,439.

Balance after deducting fixed charges, March, 1920, $49,278; twelve months, $592,089.

THE QUINCY GAS LIGHT COMPANY, a subsidiary of the Massachusetts Gas Companies, has received the approval of the Department Public Utilities for the issue of $175,000 of additional capital stock, consisting of 1,750 shares of $100 par. The proceeds will be applied to the cost of additions and permanent plant improvements.

Gas Sales Association of New England Discusses Ways and Means of Promoting the Sale of Water Heaters

(*Continued from page* 403.)

ter of fact, a heater of this type never should be sold for use in a house excepting where the family is small and the run of hot-water pipe very short. In a sense, one serious disadvantage to the business is in putting a heater in for a man at what he thinks he wants to pay for it, rather than to sell him what he ought to have, and therein is caused a lot of trouble through the indifference of the salesman or the ignorance of the salesman in not knowing what to advise. While we have in our own business put out a great many of these small automatics with very satisfactory results to the user, I am still of the opinion that it is a mistake to push the 1½-gal. size to any extent unless you know all the details of the proposed installation, the amount of hot-water run, etc. A hot-water run of 10 or 15 ft. is not bad for a heater of this type, but anything much over that is not advisable. A small automatic has its uses, however. Still, at the same time, I am of the opinion that it would be better for the customer and also for the gas company to advocate the use of a heater of not less than 2 gal. per minute capacity. When I speak of ignorance I want to relate to you a few cases that have come to my notice where heaters have been connected up contrary to every principle of common sense or good plumbing. A heater should never be connected up in any place where the mechanism cannot be readily gotten at when repairs are made.

"We had a case recently where a No. 6 heater was put in a cellar with the valve mechanism right up next to a brick wall. There was at least 6 ft. of room on each side of the heater and there was nothing to prevent its being turned around, but still this plumber or gas man put the valve mechanism next to a brick wall and when we had to repair it it had to be entirely disconnected from the hot and cold water and gas, pulled out into the room, and after the work was done it had to be reconnected. If after it had been reconnected it didn't work properly we would have had to go through the same performance again. It has been my experience that when mistakes of this kind occur there is no plumber who is willing to stand the expense of making a change. He lets the manufacturer do that; but it will save a lot of trouble if the heater is connected right in the first place.

"The present high price of gas in some places is, of course, a bar to the sale of automatics to a certain extent, and yet if people could only consider that the consumption of an automatic heater for the amount of water used is no greater than the same amount of water heated in a tank heater they would have a different view of it. There is no way of actually demonstrating the truth of this statement, but I think it true nevertheless.

"I know of people who are using small 1½-gal.-per-minute heaters with a gas range who have a bill that runs from $2.50 to $5.50 per month, and the same people with a tank water heater would probably have just as large a bill, if not larger; for the tendency in running a tank heater, as a rule, is to heat more water than required. With an automatic heater the opening and closing of the faucet governs the consumption entirely, outside of the small amount that is used in connection with the pilot.

"I have often stated — and I would like to restate it here—that the automatic water heater business to me is one of the most interesting as well as one of the most profitable lines that a gas company can push. It is interesting from the agent's standpoint because he comes in contact daily with a new problem in connection with installation.

"It is a well-established fact that any good automatic water heater was constructed to work properly and will work properly when the conditions are correct, but no automatic water heater can adapt itself to conditions. The conditions must be made correct in order to insure the proper working of the heater. The conditions that I have reference to apply more particularly to draft conditions and also to plumbing conditions. Some plumbing systems are so complicated that it is a difficult matter to get any automatic device to work on them successfully, and one particular trouble with the automatic is the so-called adjustable shower bath mixer. This device was supposed to adjust the flow of water in both the cold and hot water pipes so that there would be a proper temperature delivered from a shower. The plumber, in connecting up an automatic heater on a system of this kind, and the gas company usually make the same mistake of overlooking the fact that the water running through 100 or 125 ft. or more of copper coil is not delivered at the same pressure as that out of the cold-water pipe, on account of this excessive coil friction.

"When one of these automatic mixers is supposedly adjusted, the cold water, being delivered at a greater pressure, will by-pass into the hot-water line; and sometimes the user fails to shut off the automatic valve properly, and consequently the cold water will by-pass into the hot-water line continually, with the consequent complaint of some of them that "my heater doesn't heat at all," etc. That is only one of the various troubles that the automatic man has to contend with. Lack of knowledge is one, and particularly the lack of knowledge of plumbing systems.

"The ordinary gas fitter is not supposed to know the intricacies of a plumbing system, and when anything goes wrong that he doesn't understand, the answer is usually, 'that the heater is no good,' forgetting the fact that if they weren't any good they would not have sold for over twenty or twenty-five years in largely increasing numbers.

"There are many other things that will happen in a plumbing system that will cause trouble, but it is sufficient to have mentioned this particular one, but the satisfactory adjustment of these troubles is always accomplished if a man has any mechanical abilities and with the desire to get at the bottom of the trouble. One of the best repair men that we have had, and have at the present time, is a man who was up to the time he went to work for us, an expert glass cutter but had the mechanical head and willingness to study out a problem, and at the present time there isn't any automatic water heater problem that can stick him, or at least none has up to the present day.

"So I would recommend to the gas fraternity that if they have a man who is inclined to be mechanical and will study out a problem (if they are interested in the automatic water-heater game at all) to turn the man loose on the problems and let him study them up.

"Automatic Storage Heaters—The automatic storage heater at the present time is attracting considerable attention on account of the fact that it doesn't require a larger service or a larger meter, but it does mean a larger consumption which may or may not be of benefit to a gas company.

"The established rating of an automatic is the consumption of one foot of gas per gallon of water per minute. The average consumption from the automatic storage of all types will run about a foot and a half per gallon, the reason for this being that while the tank is thoroughly insulated there are certain periods during the day and night when the heater starts up and reheats the water in the tank, and then the heat is lost by the radiation of cold air through the coils, and naturally the consumption of gas as far as the consumer is concerned is more or less of a total loss.

"No manufacturer as far as I know would claim that an automatic storage heater is as cheap in cost to the consumer as the straight automatic. Where the difference would come would be in the question of maintenance. It will cost less as a rule to maintain an automatic storage for the average household than it possibly would for an automatic heater, for if a coil gives out and needs brazing, the expense is nominal and the burner naturally not being subjected to the corrosive effects of condensation will last—we might say—indefinitely. I find there has been a tendency to advocate the automatic storage for household use, and many of those who advocated it, that is to say the gas companies, have cooled off somewhat in their ardor on account of the complaints of high gas bills. The gas companies have few complaints from the users of the automatic, and they have come to the conclusion that the bills are not high when they really know the facts. As Mr. Pease said in his excellent paper of last year, 'They have no meter on the coal pile,' and they do not know what water heating by coal costs, but when they discard the coal range and start to use an automatic and get a bill each month which shows them they have consumed several dollars' worth of gas, that is something they had not seen before, and the effect is somewhat disconcerting. However, after they received the benefits of having an unlimited supply of hot water and have become used to the convenience of it and its ever-ready service, if they do any grumbling about the bill they don't throw the heater out on that account unless the bill is abnominally large, but they do replace the automatic storage frequently because the bill is altogether too high in proportion to the benefits derived. It takes the experience of a great many people, however, to find this out, but they do find it out eventually and consequently a change takes place.

"The field for the large automatic storage is very great and is expanding all the time. When I speak of large automatic storage heaters, I mean those from 100 gallons up to 1,000-gallon tanks for factory usages or institutions or anywhere where a large quantity is desired.

"A new field is also that of wet-wash laundries. We have one installation of two No. 300 storage heaters, which replace 300 gallons of water per hour, raised approximately 60 to 63 degrees and at a cost of about $25 per week for gas, used four days in the week. Comparing this with coal consumption and the fact that in running a steam boiler one has to have a fireman's license, the advantage is largely in favor of the use of gas, not only on account of its cleanliness but on account of its adaptability and the fact that it is always ready and requires practically no attention whatever. To the gas companies who have wet-wash laundries on their lines, I submit to you the advisability of trying to get them to switch to gas, for it means a good yearly consumption and a satisfied consumer. Office buildings, small hotels and institutions that have no regular fireman during the summer can use the automatic storage heater to great advantage.

"Now, in connection with the water heater business in general, there is one matter that I would like to hear openly discussed, not only by the other water-heater men and gas-range men present, but by new business managers or gas company managers that may be here, and that is as to what free service should be expected of a gas company from their consumers beyond the guarantee of practically one year which is now given. The manufacturers or their agents have been ready at any time to help out a consumer wherever it has been necessary, but it does seem to me there are times when more has been expected of a gas company than the consumer has any reasonable right to expect. So the question I wish to put before you for discussion is this: Why shouldn't the consumer in all cases stand the expense that may be incurred by reason of a request for some expert help to solve any problems that come up in his individual installation? Is it good practice for the gas company to give this service free?

"Most of you have stood for this expense without any outward protests, but with an inner conviction that it was an expense that rightfully belonged to the consumer.

"There are many points in the automatic and automatic storage water heater game that are of particular interest for discussion, but I do not think there is anything of any more interest at the present moment than this particular subject. I would be glad to hear from those present as to what their opinion is regarding it."

Following the paper the governor called for comments from various members present.

Elmer S. Stack, of the Stack Heater Company: "I do not wish to comment directly on the paper, but wish instead to call your attention to another matter which will be of interest to many of the gas men. Last fall we had many calls for gas house-heating systems. We built one which was used nine months last season in Lynn to the entire satisfaction of the owner. We did not intend it to be used to the exclusion of coal, but rather as an auxiliary to replace coal fires during those times when only a slight amount of heat was necessary. However, the system was so satisfactory that the owner of the system refused to shovel a pound of coal during the entire winter. The bills ran from $45 to $60 a month, but he expressed himself as being entirely satisfied with the better service and said that the extra cost was well worth while. On the strength of his recommendation we have built and installed another such system in Lynn. I invite any of you gentlemen who are interested to come to Lynn some time to see these systems. The owners will be very glad to allow you to inspect them and I shall be glad to answer any questions.

"There is considerable endeavor now to lessen the cost of installing tank heaters. They can now be connected direct to the boiler without destroying the piping or disturbing it in any way. They are attached direct to the boiler through the side connection. I call your attention to this as a means of increasing the sale of tank heaters."

William Gould: "Mr. Stack is correct in saying that no one kind of heater can be used in every place. The conditions must be studied. The house-heating proposition is interesting. We will be glad to investigate it carefully. The new type of tank heater connection is also worthy of investigation."

C. L. Fairfield, of the Fairfield & Hallett Company: "I agree with Mr. Wells' paper. I would like to have a discussion regarding the free maintenance. We charge for all maintenance, but we do endeavor to make two visits each year for which the customer does not pay. There should be a charge for cleaning and additional charge for parts needed, but what do the gas company men think about free maintenance?"

W. T. Pease, of the Ruud Manufacturing Company: "Instead of commenting on Mr. Wells' paper, I wish to call your attention to some very unusual facts which cannot fail to interest every gas man present.

"In compiling statistics recently, I ran across these truly startling results. There is, in the six New England States, a population of 4,937,653 served with gas, and a population of only 673,614 without gas. In other words, 86.3 per cent of the people in New England are prospective users of gas in some one or many ways.

"To figure the market for water heaters, we want to know how many families are served with gas and how many families are without gas. On this line, we learn that there are in the New England States some 1,662,000 families of whom there are 1,006,000 served by their respective gas companies. In other words, 60.5 per cent of the households have gas and are therefore prospects for gas water heaters. Contrast the richness of this field with the United States as a whole, for the latter averages only 38.9 per cent of the households supplied with gas.

"There are in New England over one million families supplied by gas companies. Conservatively estimating, not over 333,000 families, or 33 1-3 per cent, use gas for water heating; 666,000 families, or 66 2-3 per cent, use other fuel. Assuming that the entire 1,000,000 families who are now supplied with gas, were to use gas-fired heaters, each year the replacement alone, figuring the life of a water heater at fifteen years, would amount to approximately 66,000 water heaters. In addition, mains will be extended each year, and more families will be added to the list of prospects.

"If each of the million families in New England used only 1,000 ft. of gas for water heating, there is an annual output of 1,000,000,000 ft. The average annual gas consumption of a No. 4 automatic water heater is 48,000 ft. If each family used an automatic water heater of proper size, the possible total annual output, for water heating alone, would be 48,000,000,000 ft.

"If we realize this potential load which we have failed so far to get, and then set ourselves the task of thoroughly covering these prospects, gas manufacture and gas appliance manufacture will receive such an impetus as it has never yet felt.

"You will be interested by the figures by States. They are as follows:

State.	Number of Families.	Estimated Domestic Gas Consumers.	Percent Families with Gas, 1919.
Maine	191,000	30,000	16
New Hampshire	106,000	30,000	28
Vermont	87,000	14,000	16
Massachusetts	846,000	643,000	76
Rhode Island	141,000	90,000	64
Connecticut	291,000	199,000	68
Total families	1,662,000	1,006,000	60/5

Mr. Sumner, of Cambridge Gas Light Company: "I have never yet been to a meeting from which I have not received some worth-while thought. Appliance men have too long been a buffer between the public and the gas company officials. By the aid of Mr. Wells' paper, I have realized a new line of prospects—soda fountains, drug stores, ice cream parlors, etc.—and I shall start immediately to work these people. Mr. Pease's figures are very inspiring. They should be published so that every gas man will appreciate the opportunity before him."

J. C. D. Clark, of the Boston Consolidated Gas Company: "Water heater service calls for maintenance. The customers cannot maintain them, yet we ourselves are not prepared to maintain them. The customers will always pay reasonable charges for service rendered. On high gas bill complaints, explain to customers the difference between the temperature of the incoming water both summer and winter. Few people realize that water will raise from 35 degrees in the winter to 64 in the summer. This makes considerable difference in the gas bills. Every company should provide a system of maintenance. The great difficulty is to have the proper size of heater installed for the customer. We go to the customer and ask for permission to install the heater on trial. If not satisfactory we will take it out. If satisfactory he can pay us so much money. In this way we prevent him from making up his mind to use a heater too small for the job, but remember that maintenance is the foundation of the water-heater business."

W. L. Hallett: "One point is very interesting to me, and that is along the line of education. The manufacturer delivers an assortment of heaters to the gas company. They are all exactly alike and will all do good work under proper conditions. The return to the gas company will be in proportion to the efficiency of the heater and the efficiency of the heater will be in proportion to the efficiency of the installation. Make one man a water-heater man. It is easy to educate one man and to make him an expert, but it is another matter to educate a new business manager and his whole crew. Educational work can be improved upon greatly."

H. J. Pettengill, Jr., of Blackstone Valley Gas & Electric Company: "To get good results in selling we must first plan campaigns and, second, spend money in advertising. I am surprised to find how few companies have the proper idea of campaigns. Sell water heaters. Plan a campaign for April, May or June on automatics and tank heaters and put it across. It will take time and thought. On advertising many gas companies figure as follows: 'We must spend some money in the local newspaper for policy's sake. We must keep the company on good terms with us,' and they accordingly put in any copy they can get to fill the space. This is wrong. Plan your advertising and do it well. Try to get an appropriation larger than last year. Read the *Saturday Evening Post* and copy the advertising ideas into your business. Spend the greatest amount of your

advertising money in April, May and June. The time to advertise a business is when the business is coming. Advertise and plan campaigns."

W. F. Norton, of the Manchester Traction, Lighting & Power Company: "How does Mr. Wells figure a consumption of 1½ cu. ft. of gas per gallon of water heating in a storage system? I have a storage system in my own home and find that it burns more than 3 ft. of gas to a gallon of water. This is by actual reading of gas and water meters."

William Gould: "Go further and sell the automatic because the automatic will do away with the coal range in the winter. The tank heater is an excuse for having a coal range in the kitchen in winter so the gas company men should sell an automatic if possible. Do this in order to do away with the coal range."

Harry Crafts, of Pittsfield: "In general I find that the gas companies are in the business primarily to sell gas and the only reason we sell other things is for the sage of selling gas. We have mains, works, services and meters and after all that investment is made, it is up to us all the time to see that these are worked to the maximum capacity. There is some money to be made in developing the equipment we already have. Then in putting out new mains, we must keep in mind that loading down the meters will increase profit. The water heater is one appliance offering a basis for doing this. The tank heater will use about 8,000 ft. of gas per year. Now, I understand universally gas men do not approve fully of our scheme which we have run many years. I have never met anyone who could tell me how to invest as little as $14,000 temporarily and $2,000 permanently and get the same consumption of gas. We are selling 20,000,000 ft. of gas per year. We shall wipe out all but $2,000 and we should continue to sell 20,000,000 ft. on the investment. It is clear profit. Make each meter you have go a little faster than ever before."

Elmer S. Stack: "I would like to ask Mr. Crafts what would have resulted if he had campaigned automatic gas water heaters instead of tank heaters."

Mr. Crafts: "We thought that selling tank heaters would sell automatic water heaters, but it has not worked out so. There is no reason why the majority of houses should not heat water with gas twelve months per year."

William Gould: "It is interesting to note that companies as large as those putting out a billion feet of gas per month fall off in October to March which shows that something is going off the lines. This is probably the water heater. There is a jump in June. It is not the lighting load and it must be the range load and water heater load coming on. That is for your consideration. Twelve months per year water heating will help on this subject."

Replying to someone's question re change in water temperature, "Should we change the adjustment of the heater twice a year?" J. C. D. Clark replied: "No. Simply explain the increase of the bills to the customers." He then continued: "We have investigated connecting tank heaters and find that there are ordinarily 16 to 40 screw joints to each installation. By using these patent appliances, we have cut this number down to six joints. We have to cut holes in the customer's boiler. Mr. Stack is going to invent a plug for these holes so that if the tank heater is removed, the boiler can be continued in service."

Raymond Fancy, of Newton: "To continue on the subject of maintenance charges. We have, until very recently, given free labor. Now we charge for labor as well. We have had no serious objection to this plan. In regard to burners in the automatic heater, I believe the majority are put out with set screws. I don't see any necessity of leaving them in. We take them out and throw them away. The burners are then more easily removed when our man returns to clean the heaters. Regarding high gas bills, an inspector often investigates and finds gas leaking at a burner on the automatic heater and thus finds excuse for the high bill. These things should be eliminated."

William Gould: "We have enjoyed your paper, Mr. Wells. I thank you for the association for the work and interest you have shown.

"The next meeting is our annual meeting at which the election of new officers will take place. I hope you will all come. I announce the appointment of a nominating committee as follows: Cyrus Barnes, of Boston, Mass.; William S. Bodwell, of New London, Conn.; John L. Murray, of Biddeford, Maine.

"The new members are C. J. Connell, R. T. Smith, A. A. Laughton, W. K. Stafford and R. M. Thomson."

The meeting then adjourned.

A. G. A. Asks Priority of Coal Shipments for Gas Companies

Quick relief to gas, electric light and power companies from the present serious interruption in their coal supply as the result of the nation-wide traffic jam, will no doubt be given by the Interstate Commerce Commission through an order granting priority of shipment for coal.

Oscar H. Fogg, acting secretary of the National Committee on Gas and Electric Service, said that the commission would probably act since its attention has been called to the fact that unless relief is speedily granted to public utilities as regards a steady flow of coal, nothing can avert a shut-down of these plants and a cessation of service in localities where the most acute conditions now prevail.

"If the situation does not improve," said Mr. Fogg, "the living conditions of approximately forty-five million people who are served by gas companies throughout the United States may soon be affected. Not only are the immediate consequences of the gravest concern, but companies find it impossible to secure the fuel necessary to operate under present conditions and are utterly unable to accumulate reserve stocks. Gas plants in some sections of the country have been down to the danger line several times during the past two weeks and are struggling along from day to day, hoping for coal to come through. The effect of even a temporary interruption of such an essential service as gas supply would work irreparable injury to the public."

Appraiser Is Named for Gas Company

Alfred E. Forstall, of New York, has been appointed appraiser of the property of the Nashville Gas & Heating Company, Nashville, Tenn., by the State Railroad and Public Utilities Commission. The appointment has the approval of the City Commission, officials of the gas company, and the endorsement of Chairman Edgar C. Clark, of the Interstate Commerce Commission.

The valuation of the property will be a basis for rate-making, the commission having some time ago granted the company the right to increase its rates as an emergency relief measure.

Personal Notes

FLOYD W. WOODCOCK, for the last four years general superintendent of the Eastern Shore Gas & Electric Company, of Salisbury, Md., will leave shortly with his family for Philadelphia where, since May 1, he has been assistant public utility manager in the Day & Zimmerman, Inc., organization.

H. O. BRITT has been elected superintendent of the gas department of the Columbia Railway, Gas & Electric Company, Columbia, S. C., succeeding Claud P. Davis, who resigned to enter the insurance field in Columbia.

Mr. Britt has been in the gas business for years and is a practical expert in the line. He has been with the Columbia company for eight years as superintendent of the distribution department. His promotion to the superintendency takes effect June 1. Mr. Britt stands high in the estimation of the company officials and it is believed that he will make an exceptionally good superintendent. Before coming to Columbia Mr. Britt was connected with gas companies in Tampa, Fla., and Birmingham, Ala.

In announcing the new superintendency Mr. Wright, general manager of the company, expressed regrets that Mr. Davis was leaving the company. Mr. Davis was elected superintendent only a few months ago, but he has within the past few days bought a part interest in the Bollin and Pope insurance business on "law range" and he plans to give his entire time to this venture. Mr. Davis has been with the Columbia Railway, Gas & Electric Company for more than a dozen years. He was claim agent for twelve years before being elected superintendent of the gas department.

C. O. CULVER, since Jan. 1 of this year assistant superintendent of the Eastern Shore Gas & Electric Company, of Salisbury, Md., is now acting as the general manager of the company, pending his appointment to the managerial position which is slated to be made in a few days. He succeeds Floyd W. Woodcock, resigned.

CARL G. BARTH, who was a pioneer in the machine-building industry and to whom many other industries owe modern principles of production and management, has been elected an honorary member of the Taylor Society. Only two other men have been thus honored by the society, which is the national organization for the promotion of science in management, these being Frederick W. Taylor himself and Henri Le Chatelier, the prominent engineer who developed scientific management in France.

Mr. Barth, after engineering studies in his native land, Norway, came to this country in 1881 and was employed as a draftsman by William Sellers & Co., where he remained for fourteen years, with the exception of one year. From 1895 to 1899 he was engaged in designing and engineering work in St. Louis in technical mathematics and manual training and in preparing engineering text books. Then he became associated with Mr. Taylor at Bethlehem with whom he worked on the historic foundations of scientific management. Under Mr. Taylor's guidance he conducted experimental work on metal cutting tools and applications of slide rules in the plants of the Link-Belt Company and the Tabor Manufacturing Company.

Mr. Barth's work on the fundamental formulas in cutting metals has received world-wide recognition as one of the most important contributions to machine development.

DELAND GAS IMPROVEMENT COMPANY.—Principal place of business, Deland, Fla.; capital stock, $120,000; highest amount of indebtedness, $100,000. General nature of business: To manufacture, produce, buy and otherwise acquire, distribute, deliver, sell, exchange and otherwise deal in and dispose of gas, for light, power, heat and other purposes. The officers are Gilbert H. Moore, president; W. S. Taylor, vice-president; Frank A. Berger, secretary-treasurer, and Amos J. Parkhurst, Jr., general manager, and these, together with Samuel D. Jordan, D. B. Tutten and Clayton C. Codrington, constitute the board of directors.

LYNN (MASS.) GAS & ELECTRIC EMPLOYEES' ASSOCIATION held its monthly banquet and entertainment at the clubrooms, Thursday evening, April 22. John H. Curtin, president of the association, was master of ceremonies.

Two exhibition boxing bouts were features of the entertainment. The guests of the evening were J. R. Sheldon, of Brockton; H. K. Morrison, general manager; Frank Dubois, F. E. Drake and Eugene B. Fraser.

B. H. CONLEE, manager of the Nebraska Gas & Electric Company, of Beatrice, Nebr., will take charge of both the gas and electric departments of the Gage County Gas, Light & Power Company, succeeding Thomas Rice.

Imperial Valley Will Be Without Gas June 1

The receiver appointed to conduct the business of the Imperial Valley Gas Company, El Centro, Cal., has filed a request with the Railroad Commission to wind up the affairs of that concern and quit.

That means that if the request is granted Imperial Valley will be without gas on and after June 1, 1920.

Some time back a new company was formed to save the situation. Imperial Valley people were asked to subscribe for stock in the new concern in order to keep the gas supply going. Not enough subscriptions have been forthcoming. As a consequence they will soon be without gas, just as stated by all interested at the beginning.

Gas is a great convenience as a fuel and when the gas is shut off there will be a clamor on the part of householders for a return of the service at any cost and on any conditions. But that clamor will show a belated interest.

Stock Issue Authorized

The department of public utilities has issued the following order authorizing the New Bedford Gas & Edison Light Company, New Bedford, Mass., to issue additional capital stock:

Ordered, that the commission hereby approves of the issue by the New Bedford Gas & Edison Light Company, in conformity with all the requirements of law relating thereto, at the price of one hundred fifty dollars ($150) a share, as determined by its directors, of four thousand seven hundred seventy (4,770) shares of new capital stock of the par value of one hundred dollars ($100) each, and of bonds, at not less than par and accrued interest, to the amount of four hundred seventy-seven thousand dollars ($477,000), bearing interest at the rate of

six per cent (6 per cent) per annum and maturing January 1, 1928, said bonds to be part of a total issue not exceeding ten million dollars ($10,000,000).

The proceeds of said stock to be used in payment of outstanding obligations of the company and for improvements made to the plant before Dec. 31, 1919.

Long Island Company Withdraws Advanced Rate Schedule

The City Council has received notification from the Public Service Commission that the Sea Cliff and Glen Cove Gas Company, Glen Cove, L. I., have withdrawn the schedule of advanced rates which were to become effective May 1. No reason for the withdrawal was made known. The company intended to raise from $1.50 to $2. The council recently entered a protest with the commission regarding the advance, noting in its complaint the poor quality of gas supplied by the company.

Gas Earnings Report

The following report showing the financial operations of the Santa Maria (Cal.) Gas & Power Company, operating in Santa Maria, San Luis Obispo and counties of Santa Barbara and San Luis Obispo, for the year ending Dec. 31, 1919, has been given out by the railroad commission:

ASSETS

Fixed capital installed prior to Jan. 1, 1913	$172,021.36
Fixed capital installed since Dec. 31, 1912	347,342.98
Total fixed capital	$519,364.34
Cash and deposits	512.73
Accounts receivable	4,545.06
Working assets	7,314.10
Prepaid expenses	1,244.77
Total	$532,981.00

LIABILITIES

Capital stock	$100,000.00
Funded debt	129,000.00
Notes payable	20,000.00
Accounts payable	7,322.03
Int. and taxes accrued	6,175.53
Reserves	85,282.59
Capital surplus, appre-	
Corporate surplus	109,910.88
ciated fixed capital	75,289.97
Total	$532,981.00

Gas Plant to Close

Harry W. Walker has applied to the Public Utilities Commission for permission to close his gas plant in New Hartford, Conn., on June 30. When asked why he wished to abandon his interests in regard to the production of gas he stated that during the year which he has owned the plant he has not been able to make gas on a paying basis, and that he had kept the gas plant running solely at the request of the Public Utilities Commission. He added that there is no possibility of a prospective purchaser for the gas plant, as not enough people in New Hartford use gas to warrant its further production.

New Oil Field Is Opened in Kansas

There is a new oil town in Kansas composed entirely of oil workers and their families. It is Teeterville, in Northwest Greenwood County, about 150 miles southwest of Kansas City.

Eight wells have been brought in in this district, twenty-five miles from a railroad, the last two wells, which were brought in the last ten days, showing 200 and 325 barrels a day, respectively, of high-grade oil. No one knows the thickness of the producing oil sand, but it has been penetrated nearly one hundred feet. Teeterville is the most important new oil discovery in Kansas. There is reason to believe a field of important dimensions will be developed from the present pool.

Among the reasons put forth for believing a very important oil field is being developed in northwest Greenwood County is the great thickness of the sand being encountered around twenty-five hundred feet. Each well drilled carries the bit further into the sand until an oil sand of approximately one hundred feet thick has been penetrated without encountering water. How much thicker the sand is will be developed with the deepening of each succeeding well drilled in.

The discovery well was brought in nine months ago by the Empire Gas & Fuel Company. It was a 50-barrel well. The second well was that of the Emerald Oil Company about one and a quarter miles to the southeast of the discovery well. This well came in about the first of the year, making fifty-five barrels, and was later increased to 125 barrels a day, after being shot.

The Emerald is the most active company in the new field to-day, having brought in three wells and six more starting to drill. Other companies active in the field are the Empire Gas & Fuel Company, Phillips Petroleum Company, White Oil Corporation, Inland Oil Company, which are the Skelley interests, and the Minnehoma Oil Company. Many of the larger companies have taken acreage and are awaiting further developments before drilling.

The new Teeter field is of additional importance in consideration of the fact that Kansas and Northern Oklahoma have resumed the most important role in oil activities in the Mid-Continent field. The larger companies are drilling deeper in old proved fields and there is intense activity in drilling up outlying acreage near proved fields.

Port Arthur Company Goes Into Hands of Receiver

The Port Arthur Gas & Power Company, Port Arthur, Texas, has gone into the hands of a receiver. The plaintiff in the case is the National Utilities Company of Maine. Besides the Port Arthur firm, the Logan Trust Company, of Philadelphia, is named defendant.

The company at Port Arthur agrees to the appointment of a receiver. Judge Estes appointed F. O. Murphy, of Houston, Texas, receiver. His bond is set in at $10,000. According to the petition filed by the National Utilities Company, the debts of the gas company aggregate more than a quarter million dollars. The assets are said to be not over $200,000.

The North Texas Gas Company Sherman, Texas, has filed application with the mayor and city commissioners of Sherman for an increase in local and domestic gas rates. It is proposed to raise the rates to 75 cents per 1,000 cu. ft., together with a customer's charge of 50 cents per month.

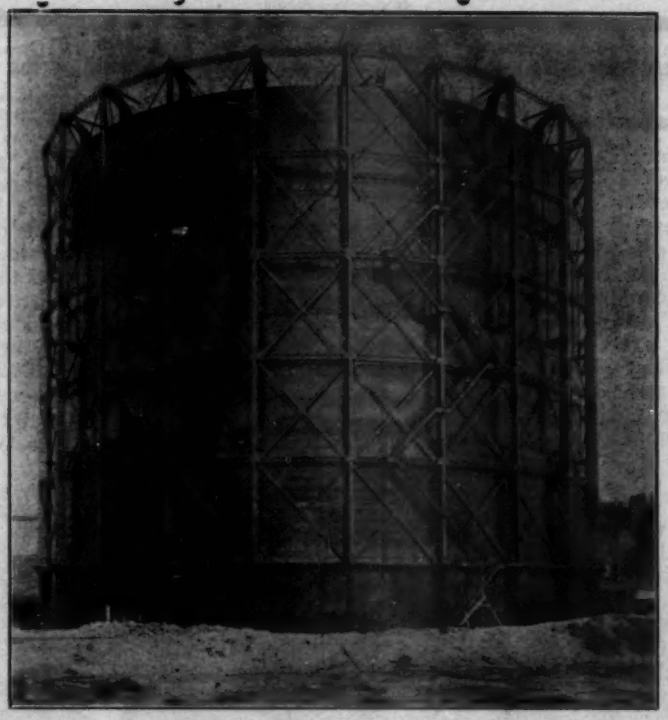
The letter incloses a communication from the Lone Star Gas Company, which commits itself to an agreement to spend not less than $750,000 in prospecting for and developing an adequate supply of natural gas.

Sherman is at present paying 50 cents per 1,000 cu. ft.

RITER-CONLEY CO.

PITTSBURGH, PA.

PURIFYING BOXES



STEEL TANKS

BUILDERS OF

TWENTY YEARS EXPERIENCE **GAS HOLDERS** HAS TAUGHT US HOW

STEEL CONSTRUCTION OF ALL KINDS

Philadelphia Washington Pottstown New York Detroit Boston Chicago Syracuse Cincinnati San Francisco

GAS PURIFYING MATERIALS

NATRONA RED ORE
To Be Mixed With Fluffing Material

MINERAL SPONGE
The Best Fluffing Material

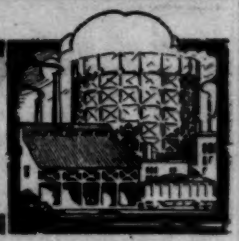
MINERAL SPONGE OXIDE
Prepared For Use

PENNSYLVANIA SALT MFG. CO.

WIDENER BUILDING

PHILADELPHIA PENNA.

With The Equipment & Appliance Manufacturers



Conducted by Business Department of American Gas Engineering Journal

A Recording Gas Calorimeter

The Precision Instrument Company, Newark, N. J., has developed a recording calorimeter for gas works which under several tests has given satisfactory results with a minimum of care and expense.

The instrument is known as the "Precision Calorgraph," and it records the gross heating value of a gas under the actual atmospheric conditions of temperature and pressure. It not only tells the gas plant operator at any moment the heating value of the gas he is making, but it records this value on a chart, thus giving a permanent record for the whole twenty-four hours. It eliminates the tedious and expensive process of taking readings on the indicating calorimeter at frequent intervals.

The operation of the instrument can best be understood by comparing it to the indicating calorimeter. With the indicating calorimeter the volume of gas, the quantity of water and the rise in temperature of the water must be measured and the heating value calculated from these variables.

This same principle is used in the precision calorgraph, except that air is used to absorb the heat of the gas in place of water. The heat from the combustion of a constant volume of gas is caused to warm a certain quantity of air, thus making the rise in temperature of the air a measure of the heating value of the gas. This rise in temperature of the air is measured by a differential thermometer, the movement of which is transmitted to a pen arm. The pen records the heating value of the gas upon a chart moved by clockwork.

The constant consumption of gas is obtained by means of the patented volume governor, which compensates for variations in both the pressure and specific gravity of the gas. The gas enters the instrument at 20 (the connection 19 is for test only), first passing through the pressure regulator 16, and then going to the volume governor. The pressure regulator takes care of any large fluctuation of pressure in the line, and delivers the gas to the volume governor at an approximately constant pressure.

The volume of gas flowing to the B.t.u. burner 11 is determined by the pressure before the orifice 13; i. e., the pressure in the chamber 15. Any increase in pressure in the chamber 15 will tend to raise that side of the cradle, thus closing the valve 17 and bringing the pressure back to normal. Also any decrease in specific gravity of the gas will reduce the weight of gas in the gravity tube 10, thus reducing the pressure in the chamber 14. This has the same effect as removing part of the weight from the left side of the cradle, therefore reducing the pressure in the chamber 15 an amount proportional to the specific gravity of the gas and keeping the flow to the B.t.u. burner 11 constant as the specific gravity changes. Similarly a decrease in pressure or an increase in specific gravity will have the opposite effect.

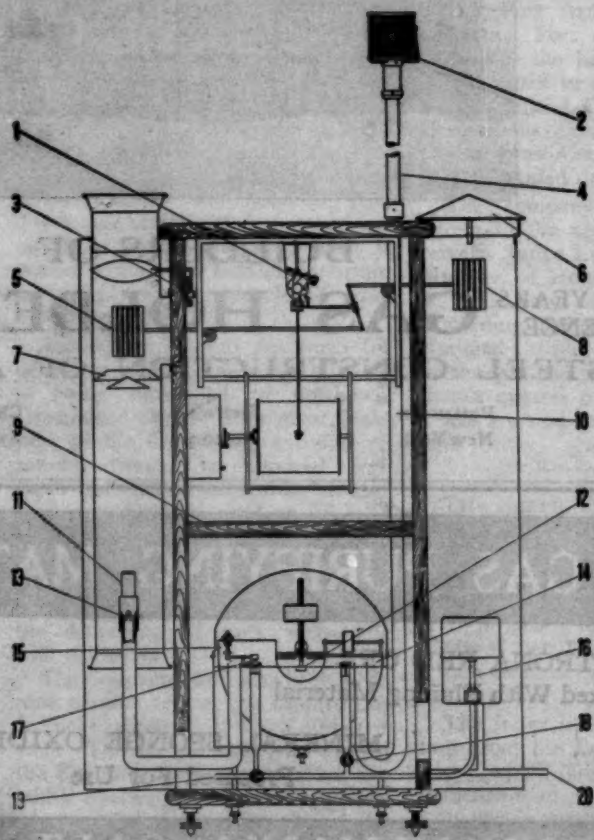


FIG. 1

The air enters the instrument at 6, passing over one diaphragm 8 of the differential thermometer and then down under the volume governor to the B.t.u. burner 11. The products of combustion and heated air rise through the stack, passing over the other diaphragm 5 of the differential thermometer. The baffle 7 protects the diaphragm from the direct radiation of heat from the B.t.u. burner 11. The diaphragms are connected to the pen arm by suitable rods and levers to record the heating value of the gas upon a chart graduated in the proper units. The chart passes over a drum revolved by clockwork.